**DISSERTATION**

**ON**

# ''A STUDY TO ASSESS AND COMPARE THE EFFECTIVENESS OF FENUGREEK LEAVES WITH ELEMENTAL IRON AND ELEMENTAL IRON ALONE ON ANEMIA AMONG WOMEN RESIDING IN SELECTED COMMUNITY AT CHOOLAI, CHENNAI''.

**M Sc (NURSING) DEGREE EXAMINATION**
**BRANCH –IV COMMUNITY HEALTH NURSING**

**COLLEGE OF NURSING**
**MADRAS MEDICAL COLLEGE, CHENNAI – 600003.**

*A dissertation submitted to*

**THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY,**

**CHENNAI – 600 032.**

*In partial fulfillment of requirements for the degree of*

**MASTER OF SCIENCE IN NURSING**

**APRIL 2016**

## CERTIFICATE

This is to certify that this dissertation titled **''A study to assess and compare the effectiveness of fenugreek leaves with elemental iron and elemental iron alone on anemia among women residing in selected community at Choolai, Chennai''.** is a bonafide work done by Ms.Visithra.J II Year M.Sc (N) student, College of Nursing, Madras Medical College, Chennai – 600003 submitted to **The Tamilnadu Dr.M.G.R. Medical University, Chennai-32,** in Partial fulfillment of the requirements for the award of Degree of Master of Science in Nursing, Branch - IV, Community Health Nursing under our guidance and supervision during the academic period from 2014 – 2016.

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# ABSTRACT

**TITLE**

**A study to assess and compare the effectiveness of fenugreek leaves with elemental iron and elemental iron alone on anemia among women residing in selected community at Choolai, Chennai.**

The prevalence of anaemia is rapidly increasing all over the world at an alarming rate over the recent years.

**Need for the study:** According to NFHS-3, 53.1% of the women aged 15-49 years are anemic. The increase incidence of anemia in developing countries follows the low socio economics, dietary habits, etc. The consumption of fenugreek leaves juice is an influencing factor in improving blood hemoglobin level among anaemic womens.

**Objectives of the study:**

1. To assess the pre-test hemoglobin level among women in experimental group and control group.
2. To assess the post-test hemoglobin level among women in experimental group and control group.
3. To compare the pre-test and post-test hemoglobin level among women in experimental and control group.
4. To assess the effectiveness of fenugreek leaves with elemental iron among women in experimental group.
5. To associate certain demographic and clinical variables with hemoglobin level among women in experimental group.

**Key words**-(Anemia, Hemoglobin, Fenugreek leaves, elemental iron).

**METHODOLOGY**:

**Research approach**: Quantitative approach.

**Research Design:** An experimental study with pretest posttest control group research design.

**Study population and study setting**: Anemic women within 25-45year age group in selected areas at Choolai.

**Sample size:** 60 women (30 in experimental and 30 in control group)

**Sampling Technique:** Samples were selected by using simple random sampling technique by lottery method was used.

**Data collection procedure:** Structured interview schedule and Bio physiologic method using sahil's heamoglobinometer.100mg elemental iron capsule then 5gm fenugreek leaves powder mixed with 200 ml of water was given to the women in experimental group after breakfast daily for 14 days and in control group give only 100mg elemental iron.

**Data analysis:** The obtained demographic data were analyzed by using descriptive analysis (frequency, percentage, mean and standard deviation) clinical data were analyzed by inferential statistics used chi square test, student independent t test and paired t test.

**Results:** The findings of the study, pre-test mean haemoglobin in the experimental group was 8.3mg/dl, and post-test mean haemoglobin was 9.8mg/dl, and inferential statistics analyzed by paired "t" test.t=12.08,p=0.001*** whereas in control group the pre-test mean hemoglobin was 8.4mg/dl, and post-test mean hemoglobin was 8.94mg/dl t = 31.71,P = 0.06.

**Discussion:** In experimental group highly significant with percentage difference hemoglobin with 95% confidence interval is 15.20%, and control group is 5.82% this shows the effectiveness of elemental iron and fenugreek leaves was effective to improvement in blood haemoglobin level in anemic women

**Conclusion**: Fenugreek leaves and elemental iron is easily available and improves the general wellbeing of the women and prevent complications.

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## ABBREVATIONS

| | |
|---|---|
| DF | Degree of Freedom |
| SD | Standard Deviation |
| CI | Confidence Interval |
| Fig | Figure |
| H | Research Hypothesis |
| M.Sc (N) | Master of Science in Nursing |
| NFHS | National Family Health Survey |
| NO | Number |
| WHO | World Health Organization |
| X2 | Chi square |
| F | Frequency |
| P | Probability |

# CHAPTER – I

# INTRODUCTION

# CHAPTER –I

## INTRODUCTION

***"Start by doing what's necessary; then do what's possible; and suddenly you are doing the impossible."***

***-Francis of Assisi***

Anemia is a major public health problem in developing countries, contributing significantly to morbidity and mortality is high in women and adolescent. Prevalence of anemia in developed and developing countries in women is 14 per cent in developed and 51 per cent in developing countries and 65-75 per cent in India.

Anemia is the most common nutritional deficiency disorder in the world. Although both males and females of all ages are affected in Iron deficiency. Women are particularly susceptible to iron deficiency anemia because of the increased need for the dietary iron for hemoglobin and myoglobin synthesis, during the rapid period of growth of the cells.

According to World Health Organization (WHO) estimates that anemia affects over 1.62 billion people worldwide. The most affected group is preschool-age children, with a prevalence of 47%, followed by pregnant women (41%), non-pregnant women (30%), school-age children (25%), and people older than 60 years of age (24%); men are the least affected group (12%).

Anemia is a global public health problem, prevalence is highest in developing countries with major consequences for human health as well as social and economic development was found to anemia. It occurs at all stages of the life cycle, but is more prevalent in women and young adolescents.

Iron is one of the micronutrient. It is used for the formation of hemoglobin, oxygen transportation, brain development, regulation of body temperature and

muscle activity. The decreased hemoglobin level is called as iron deficiency anemia. Diminished work capacity and physical performance of persons with a diminished concentration of hemoglobin.

Women are more prone to get anemia due to inadequate intake or poor utilization of dietary iron due to poor diet. Anemia may be caused not only by a deficiency of iron (or, less often, of other nutrients) but by other conditions. Malaria, hookworm disease hookworm infestation, diarrhea, HIV/AIDS, genetic disorders (e.g., sickle cell and thalassemia), blood loss during delivery. Heavy menstrual blood flow and closely spaced pregnancies.

While in menstruation periods the volume of menstrual blood lost is relatively constant for a given woman from month to month, it ranges between 25 and 30 m1 per month. This represents an iron loss of 12.5-15 mg per month, or 0.4-0.5 mg per day over 28 days.(WHO/INACG/UNICEF) guidelines recommend universal iron and folic acid supplementation for young children, adolescents and pregnant women where anemia is highly prevalent means give daily iron supplementation.

Periodic deworming should be encouraged for every 6 months once, maintaining hygienic practices like hand washing, avoid bare foot while going to the toilet and regular hemoglobin screening tests will identify the iron deficiency anemia in early stage. Iron deficiency anemia will be prevented by adequate dietary intake or iron rich foods such as green leafy vegetables, cereals, legumes, dhal, nuts dates, and fruits.

Fenugreek leaves with its high beta carotene content (19mg/100gm leaves), ascorbic acid (220.97mg/100gm) rich sources of energy, natural antioxidants, polyphenols and minerals. Fenugreek leaves is good sources of protein and excellent sources of Calcium, Magnesium, Potassium, Phosphorus and moderate sources of Zinc, richer amount of iron in fenugreek leaves. Amounts of alkaloids followed by moderate amounts of saponins, phenolic and flavonoids is present in each leaves.

## 1.1 NEED FOR THE STUDY

**"Let us put our minds together and see what life we can make our society people."**

**-Sitting bull quotes**

Anemia is the term that indicates a low red cell count and a below normal hemoglobin or hematocrit level, resulting in lower quantities of oxygen available to support the body's activities, anemia is a reduction below the normal in the number of erythrocytes, is a major determinant of morbidity globally.

Anemia is associated with impaired oxygen delivery, decreased exercise tolerance and a reduced quality of life in older adults, it can also result in impaired tolerance for ischemia and has been associated with worsened outcomes in several diseases including renal failure, heart failure, myocardial infarction, and cancer.

The World Health Organization (WHO) estimates that iron deficiency is responsible for approximately 50% of all anemia cases. WHO estimates that in 2004, iron deficiency anemia (IDA) resulted in 273 000 deaths: 45% in Southeast Asia, 31% in Africa, 9% in the Eastern Mediterranean, 7% in the Americas, 4% in the Western Pacific, and 3% in Europe, with 97% occurring in low- and middle-income countries. Nutritional deficiency anemia is very common in India and iron deficiency is the commonest nutritional deficiency all over the world.

According to the medical journal Lancet, anemia affects a quarter of the global population, including 293 million (47%) children younger than 5 and 468 million (30%) women. In India, the prevalence of anemia was found to be higher than that of Bangladesh, Nepal, Sri Lanka and Pakistan and South East Asian countries.

According to NFHS-3, 53.1% of the women aged 15-49 years are anemic. The prevalence of anemia in India is reported in urban and rural is 50% and 60%.

Early detection, management, nutrition awareness and dietary modification would reduce the severity of anemia. Among fenugreek leaves is one of the green leafy vegetables which are rich and natural source of iron. Since it is cultivated all over India. Therefore, it could be affordable by all sections of the community at low cost. In addition, it contains more vitamin A, more calcium, more iron, more vitamin C as well as potassium.

The researcher identified many women with anemia at Choolai during the survey, so the researcher was interested to conduct study in women with anemia. In Choolai total population is 58,744 in that 22,437 females, 25,507 males, and 10,800 children. In that anemic women are 5,367. Hence the investigator is motivated to analyze the effectiveness of fenugreek leaves with elemental iron on anemia among women residing in selected community at Choolai Chennai.

### 1.2 Statement of the problem

**''A study to assess and compare the effectiveness of fenugreek leaves with elemental iron and elemental iron alone on anemia among women residing in selected community at Choolai Chennai.''**

### 1.3 Objectives of the study

1. To assess the pre-test hemoglobin level among women in experimental group and control group.
2. To assess the post-test hemoglobin level among women in experimental group and control group.
3. To compare the pre-test and post-test hemoglobin level among women in experimental and control group.
4. To assess the effectiveness of fenugreek leaves with elemental iron among women in experimental group.
5. To associate certain demographic and clinical variables with hemoglobin level among women in experimental group.

## 1.4 Operational definition

**Assess:**

It refers to the systematically and continuously collect, validate the information about anemic women.

**Effectiveness:**

Effectiveness refers to increase the hemoglobin level after administration of fenugreek leaves and elemental iron for 14 days.

**Fenugreek leaves:**

Fenugreek leaves powder 5gm mixed with 200ml of water. Fenugreek leave has been used as a remedy for anemia. It increases the hemoglobin level.

**Elemental Iron:**

100mg of Elemental iron tablet. It is easily absorbed.

**Anemia:**

Anemia means reduction of the serum hemoglobin level below the range of 7gm/dl of the women.

**Women:**

In this study women belonging to the age group of 25-45 years.

## 1.5 Assumption

The study assumed that,

1. Most of the women are anemic.
2. Anaemia significantly reduces the physical work capacity and productivity
3. Iron supplements help to increase the hemoglobin level.

4. Fenugreek leaves enhances the iron absorption, thereby increasing the hemoglobin level.
5. Anemia is preventable and curable.

## 1.6 Hypothesis

- ❖ H1: There is a significant difference between pre-test and post-test haemoglobin level among anaemic women between the experimental groups and control group.
- ❖ H2: There is a significant association between selected demographic and clinical variables with haemoglobin level among anaemic women in experimental group.

## 1.7 Delimitation

- The study is delimited to a period of four weeks.
- The study is delimited only to the area of urban womens having anemia.
- The study is delimited within the Choolai premises.

# CHAPTER – II

# REVIEW OF LITERATURE

# CHAPTER-II

# REVIEW OF LITERATURE

This chapter deals with the information collected with the relevant to the present study through published and unpublished materials. These publications are the foundation to carry out the research work. Highly extensive review of literature pertaining to research topic was done to collect maximum information for laying foundation of the study. The survey of the related literature is an important step in conducting educational research. It enables the investigator to locate the gaps and find the trends in research in a particular field. The information about the designs, samples and research tools employed by other investigators help the future investigators to formulate their design with more accuracy. Investigators must be aware of the researches conducted in the past and only then he/she will be in a position to contribute something in original. Good (1972) has rightly remarked without a critical study of the related literature, the investigator will be grouping in the dark and perhaps uselessly, repeat the work already done. Therefore to save time, energy and resources it is necessary to undertake a detailed and penetrating study of all available literature.

This section has two parts:

2.1 Review of related literature

2.2 Conceptual framework

## 2.1 REVIEW OF RELATED LITERATURE

### 2.1.1 Literature related to prevalence of anemia among women.

### 2.1.2 Literature related to treatment of anemia.

### 2.1.3 Literature related to the effectiveness of fenugreek leaves and elemental iron on anemia.

### 2.1.1Literature related to prevalence of anemia among women

**Nutritional Anemia - Historical perspective:**

Father of modern medical science and the great Greek philosopher **Hippocrates (460-377 BC)** had said nearly 2500 years ago "Let thy food be thy medicine and thy medicine be thy food". Our body has the inbuilt ability to heal itself if provided proper nutrition.

The word "anemia" is composed of two Greek roots that together mean “without blood" an (without) + Haima (blood) Anemia was first recognized as chlorosis (a Greek term meaning green)"the green sickness".

Historians are not sure when this identification first appeared but in the 16th century it was associated with a series of symptoms i.e. pallor, fatigue, poor appetite, gastrointestinal, neurological and menstrual abnormalities common in adolescent girls.

**Stockman (1895)** proposed that chlorosis was the result of a nutritional iron deficiency. But the view of Stockman was largely ignored for decades before nutritional cause of anemia was established in twentieth century.

**Bharkavi., et al (2014)** Conducted case prevalence of anemia among women of rural community in Vizianagaram, north coastal Andhra Pradesh**.** 966 subjects were enrolled for the study of whom all the study subjects did not meet the criteria of WHO standards of normal grade i.e.>11 gm/dl. 100% anemic condition was seen. 52.73% has a mild degree of anemia, 40.97% have moderate anemia and 6.28% has severe anemia. The study confirms that preventing anemia is a challenge. Early detection and treatment of anemia to avoid various complications.

**Mehnaz. S et al (2014)** Conducted study on the Case Prevalence of Iron deficiency Anemia in 100 non-pregnant women in Department of community medicine, Jawaharlal Nehru Medical College, The study revealed that iron

deficiency anemia 98.87% was found in the study population. Mild 14.8%, moderate 72%, severe 13%. The study concluded that adolescent and on pregnant females of reproductive age group should be included in government's RCH program diet.

**Olujimi Olatunbosun., et al (2014)** Cross-sectional analytical study was conducted of 400 women at the booking clinic at the University Teaching Hospital Bihar, over a 16-week period. The packed cell volume and red cell morphology of each woman were determined. Anemia with an estimated prevalence of 35–75% among women is a major cause of death. Their bio data, medical histories, and results of other routine investigations were obtained with questionnaires and analyzed. The mean packed cell volume was 31.8% and 54.5% of the women were anaemic. The commonest blood picture was microcytic hypochromic and normocytic hypochromic suggesting iron deficiency anaemia.Anaemia was significantly and independently related to a HIV positive (OR = 0.2; $P$ = 0.010), and low social class (OR = 0.3; p= 0.00). where hematinic supplementation can be given and appropriate investigations and treatment of causes of fever and management of HIV can be instituted.

**Haggaz AD., et al (2013)** Conducted study on Case Prevalence of anemia and the various socio demographic factors associated with anemia among 500 women at an urban health center in Aurangabad, India. Overall prevalence of anemia the women was found to be 87,215factors such as religion, level of education of women and their husbands and socio economic status were found to be significantly associated with the prevalence of anemia in women. ($p<0.05$).

**Singh (2013)** Cross sectional study was conducted about the prevalence of anemia among women at rural area Meerut, U.P. From which 504 women from 24 sub centres of Meerut were selected. The prevalence of anemia was 34.5%. The prevalence of mild, moderate and severe anemia among women was 19.05%, 14.0% and 4.5% respectively.

**Yarlini balarajan. et.al (2013)** Conducted to cross sectional study the patterns of social inequalities in anemia over time among women of reproductive age in India. Over the 7 year period, anemia prevalence increased significantly from 51.3% to 56.1% among Indian women. There was marked state variation in anemia prevalence; in only 4 of the 25 states did anemia prevalence significantly decline. In both periods, anemia was socially patterned, being positively associated with lower wealth status, lower education and belonging to scheduled tribes and castes. In this context of overall increasing anemia prevalence, adjusted relative and absolute socioeconomic inequalities in anemia by wealth education and caste have narrowed significantly over time.

**Premananda bharati., et.al (2012)** A Cross sectional study investigates the severity and distribution of anemia among non-pregnant and pregnant women aged 15 to 49 years in rural and urban sectors of 26 states in India and its association with certain economic and biosocial factors. A national survey was conducted to collect data on hemoglobin, height, weight and certain economic and biosocial factors of 72,660 non pregnant and 5619 pregnant women. Women's education and standard of living in the households have a vital role in reducing anemia.

**Simon Brooker, Peter J. HotezOne** (**2012)** A Meta-analysis study was conducted in sub-Saharan Africa (SSA). One hundred and five reports were screened and 19 were eligible for inclusion: 13 cross-sectional studies, 2 randomized controlled trials, 2 non-randomized treatment trials and 2 observational studies. Comparing between uninfected women and heavily infected women. All identified intervention studies showed a benefit of deworming for maternal or child health. We estimate that 37.7 million women of reproductive age in SSA are infected with hookworm in 2005 and that approximately 6.9 million women are infected. Evidence indicates that increasing hookworm infection intensity is associated with lower haemoglobin levels in women in poor countries.

**Bhoite & Iyer, (2011)** A study was designed by on magnitude of malnutrition and iron deficiency anemia among rural school aged children in Vadodara district, Gujarat. Forty eight government primary schools were selected for the study. On examination, the prevalence of iron deficiency anemia was 73%. Majority children were in mild to moderate category hence, concrete efforts should be made to curtail the prevalence otherwise it may worsen to severity. It was seen that percentage of anemic children increased as the severity of underweight increased. Only 25% of the mild underweight children were anemic as against 42% of anemia in severely underweight category.

**Brabin L., et.al (2011)** conducted cross sectional study anemia is highly prevalent among women of reproductive age in south East Asia. In this study, the hemoglobin levels of 2813 women living in inner city Mumbai, India, were measured as part of a reproductive health study. Women were recruited over a two-year period at three health facilities providing pregnancy and post-partum services. Five reproductive groups were studied, and the hemoglobin values differed significantly among the groups. Infertile women and women without living children had the highest hemoglobin values ($p<.01$). The study concludes that nutritional interventions that focus on reducing fertility or iron supplementation during pregnancy are beneficial, but many women remain iron deficient.

**Siddharam, Venketesh, & Thejeshwari, (2011).** A cross sectional survey was conducted in selected Anganwadi centers of rural areas of Hassan district, Karnataka. The sample size consisted of 314 adolescent girls between 10-19 years of age and the intervention period extended for 3 months. Results showed that the prevalence of anemia was found to be 45.2%. A statistically significant association was found between weight loss and anemia, pallor and anemia. It was seen that about 44.1% were mildly anemic, 54.92% were moderately anemic and 49.2% were severely anemic.

**Teena thacker., et.al (2011)** the researchers reviewed the epidemiology, clinical assessment, pathophysiology and consequences of anemia in low income and middle income countries. The analysis showed that anemia was disproportionately concentrated in low socio-economic groups and that maternal anemia was strongly associated with child anemia. Data from the NFHS estimates the prevalence of 55.3% among women of reproductive age and 69.5% in children under 5 in India.

**Sanjay. et.al (2010)** research estimates the prevalence of anemia among 100 tribal women. A cross sectional study was conducted in Mangalore. Among the subjects 11 were severely anemic, 33 were moderately anemic and 56 were mildly anemic. This study calls for an appropriate action and intervention in this tribal population to treat and prevent anemia.

**Rakesh Kumar Singh (2010)** conducted research investigates the prevalence and determinants of anemia among women in EAG states. The researcher has examined the effects of lifestyle variables on the anemia level of women of age group 15-49 years. About 40% had mild, 13% had moderate and 1.4% had severe anemia. Those women who belong to the 15-19 year age group no and low education, poorest quintile and 3+children are significantly more likely to be anemic. Those women who are under weight, have been working in the past years, smoke and chew tobacco have no exposure to mass media and never eating pulses and fruits are found to be more anemic.

**Meseret alem. et.al (2010)** a cross sectional study was conducted at azezo health center among the 384 study participants, the prevalence of anemia was 83. The majority of anemic cases 49% were mild, 46% were moderate and 5% were severe anemia. Women with age >34, rural residence, history of malaria attack, hookworm infection and absence of iron supplements are significantly associated with increased risk of anemia.

**Nahala Hwalla et al (2010)** conducted a national survey of 540 non pregnant women age 15-49 yrs to find the prevalence and determinants of anemia

and Iron deficiency in Lebanon. Result showed 33% of the subject had iron deficiency and 13.5% had Fe deficiency anemia, 8% were anemic with value >15microg/L.

**Surga .K et al (2010)** A cross sectional study was conducted to assess the Case Prevalence of iron deficiency anemia in pregnant woman in Bali and determine the risk factor for anemia among 1,684 pregnant women in 42 villages in Bali. Study found that iron deficiency anemia among pregnant woman was 46.2%; most of the cases of anemia were mild. The risk factors for anemia identified in this study, level of education, antenatal intake of iron pills. Study concluded that given the high prevalence of iron deficiency anemia in pregnant women, preventive measures e.g. iron supplement, iron fortification of food .

**Melaku Umeta et al (2009)** conducted a cross sectional study of analytical nature in 270 clustered village of Ethiopia drawn from 9 administrative regions of the country to estimate the magnitude of iron deficiency anemia among reproductive age group women. A total of 22,861 women of reproductive age group(15-49 years) were examine clinically .Result showed that prevalence rate of clinical anemia, iron deficiency and iron deficiency anemia were 11.3%, 30.4%, 49.7% and 17.0% respectively. The majority of anemia in women was in the category of mild 19.3% Moderate 10.3% and severe 0.9%.Most affected age groups were those between36-49 yrs.

**National Family Health Survey II (2008)** also reported that overall 52 percent of married women and 74 percent of children aged 6-35 months are anemic in India, out of which majority are moderately anemic. In Rajasthan, the highest prevalence of anemia i.e.82.3 percent in pre-school children has been reported.

**Rockey (2007)** observed that the main common cause of iron deficiency anemia is Gastro intestinal bleeding (acute or chronic). Low iron bioavailability of the diet is the primary cause of iron deficiency anemia in the developing countries.

**Nutritional anemia -General Health and Immunity:**

**Jarrah .S et al (2012)** from their study of 206 adolescent girls and 65 women mentioned that 50% of anemic females reported daily symptoms or dizziness, fatigue, headache and depression.

**Grondin M et al (2012)** concluded that iron deficiency impairs the perceived general health in females and suggested that further research should be conducted on this subject.

**Strauss RG (2011)** analyzed the literature available till 1977 to define possible relationship between infections, immune function and state of iron imbalance and stated that inflammatory response is clearly diminished in iron deficiency. The precise molecular defect remains undefined but the abnormality is detected by several assays measuring cell mediated immunity. Normal function is usually restored following iron repletion.

**Nutritional Anemia- Physical Performance:**

**Scholz BD et al (2014)** from their study concluded that anemia is associated with reduced productivity of women workers even in less physically strenuous works. Anemic workers produced an average of 5.3%less in the factory and performed an average of 6.5 hours less house work per week.

**Koziol BJ et al (2012)** did study on rats regarding changes in work tolerance in moderate and severe iron deficiency anemia. There results indicated that there are physiological and metabolic adjustments in anemia, even though lowered level of tolerance is reached in these cases.

**Nutritional Anemia- IQ and Cognitive Performance:**

**Lozoff B et al (2011)** found lower mental and motor test scores in infants with iron deficiency anemia even after factors relating to birth, family background, parental IQ and other nutrition were considered.

**Beard JL et al (2009)** studied the effects of iron deficiency anemia in postpartum females regarding their cognitive and behavioral performance and mother-infant interaction. They found strong relation between iron status and depression, stress and cognitive functioning in mothers during postpartum period.

**Nutritional Anemia- Obstetric Outcome: Maternal**

**Rush (2013)** reported that the risk of death is greatly increased with severe anemia (Hb < 7.0 g %); but there is little evidence of increased risk associated with mild or moderate anemia.

**Bernard JB et al (2011)** analyzed the cross-sectional, longitudinal and case control studies to find the relationship of anemia as a risk factor for maternal mortality and reported that the relative risk of mortality associated with moderate anemia was 1.35 and for severe anemia it was 3.51.

**Bedi Net al (2011)** studied maternal deaths in an ICMR Task Force Study and found that anemia was responsible for 11.5% maternal deaths.

**Corwin EJ et al (2010)** reported that women suffering from early postpartum anemia is at increased risk of developing postpartum depression.

**Obstetric Outcome: Perinatal**

**Hokama T et al (2014)** reported that iron stores measured by serum ferritin are significantly lower in newborns of mothers with iron deficiency anaemia.

**Klebanoff MA et al (2013)** from prospective study of 35423 pregnancies reported that anemia is not a strong factor in the pathogenesis of preterm birth. Early in the third trimester there was a weak association between anemia and preterm delivery. Anemia after 30 weeks gestation was not associated with preterm birth. Subsequently in 1991 however they reported that anemia during second trimester was associated with preterm labour.

### 2.1.2 Literature related to treatment of anemia.

**Dowswell T., et.al (2014)** Anemia is a frequent condition among women from developing countries who have insufficient iron intake to meet increased iron needs of the women. Traditionally, anemia has been prevented with the provision of daily iron supplements throughout life, but adherence to this regimen due to side effects, interrupted supply of the supplements, and concerns about safety among women with an adequate iron intake, have limited the use of this intervention.

**Gillespie S., et.al (2013)** Experimental study was conducted to demonstrate the bioavailability of Bengal gram and its anemic women were selected. A Bengal gram recipe including tomato was given to them. After supplementation, the percentage of anemia was reduced in the case of severely anemic by 25.3% and in case of moderately anemia by 4.1%. The study suggested that iron status of women can be improved by supplementation of iron rich diet.

**Vijayalakshmi., et.al (2012)** Conducted a true experimental study to assess the bioavailability of iron mug beans and its effects on the nutritional status of women at mulaivail, Karur. 150 samples were selected among the age group of 30-35 years. The anthropometric measurement and serum hemoglobin, iron binding capacity tests were done for them. The intervention was given for about 20 days oral iron. Before the intervention the mean value of hemoglobin was 9.1 gm/dl and after the intervention was 11.3gm/dl. There was a significant difference in the hemoglobin level ($p<0.001$).

**Viteri FE., et.al (2012)** Iron supplementations with daily iron are effective to reduce the risk of low weight, giddiness and to prevent anemia and iron deficiency. Associated other side effects and particularly breathing difficulty at currently used doses suggest the need to update recommendations on doses and regimens for routine iron supplementation.

**Alofa. et.al (2011)** conducted a quasi-experimental study to evaluate the impact of an intensive dietary program for the treatment of iron deficiency anemia among women in Berlin. Totally 68 women were selected a samples aged 25-35 years. The nutrition education for 4 weeks and bioavailability of dietary iron for22 weeks were given. The findings of the study revealed that mean hemoglobin and serum ferritin values were also significantly higher in the intervention group than in control group.

**Goudarzi.,et.al (2011)** Experimental study was conducted in a remote rural hilly with 25 families to know the effectiveness of iron supplementation by directly observed home based twice daily iron therapy through village youth volunteers, 100 mg iron was administered twice daily under direct supervision to 33 anemic patients at home for 30 days. Results showed 29 patients completed 3 months twice daily iron therapy without interruption was rapidly increased hemoglobin levels.

**Skeaff. et.al (2011)** investigated the efficacy of a dietary regimen involving increased consumption of iron-rich foods with ascorbic acid and enhances of iron absorption and decreased consumption of inhibitors of iron absorption and a low dose iron supplement for increasing iron stores in young adult women with mild iron deficiency. The investigator concluded that intensive dietary program has the potential to improve the iron status of women with iron deficiency.

**Geerlings.,et.al (2010)** conducted a community based randomized controlled trial to assess the effects of cooking in iron, aluminum cooking pots in Malawian households in an area with high malaria prevalence. They concluded that consumption of food prepared in iron cooking pots shows a significant rise in hemoglobin after 6 weeks use. Using an iron cooking pots in developing countries could provide an innovative way to prevent iron deficiency anemia in malaria areas where regular iron supplementation is problematic.

**Fishman., et.al (2009)** investigated a systematic review of vitamin supplementation trials that reported changes in anemia or iron status. Resume of the study shows vitamin A can improve hematological indicators and enhance the efficacy of iron supplementation based data showing it is efficacy in reducing anemia or iron deficiency.

**Pena Rosas JP et al (2009)** studied 49 field trials involving 23,200 women and concluded in Cochran Database of Systematic Reviews (2009), that universal prenatal supplementation with iron or iron + folic acid provided either daily or weekly is effective to prevent anemia and iron deficiency at term. There is need for revising iron doses and adjust preventive iron supplementation recommendations.

**The National Nutritional Anemia Prophylaxis Programme (2009)** An experimental study was conducted to assess the effectiveness of nutritional intervention among women with anemia in selected village Thiruvallur District. The objective of the study was to assess the pretest and post test level of hemoglobin among women with anemia and to determine the effect of consuming nutritive balls on Hb level of women with anemia. Sample size was 60. The result showed there was a reduction in the percentage level of 7-9gms/dl in women from 30% to 3.3% and 60% to 86.7. In experimental group, pretest Hb is 9.59gm and post test Hb is 10.18gm. The gain score is 0.59gm whereas in control group, 0.07gmscore is observed. Hence the effect of nutritional ball was proved. This study was concluded that consuming nutritive balls along with vitamin C is an effective method of increasing the Hb of women.

**Clung JP et al (2008)** recently reported that iron supplementation is beneficial for mood and physical performance in female military personnel in USA during training period.

**Gibson, Hotz,Temple, Mittimumi, & Ferguson, (2008)** Hence, the dosage of iron in iron-folic acid tablets was increased from 60 to 100 mg in 1992 Most iron supplementation programmes worldwide use ferrous sulphate, which

provides iron in a form that is well absorbed. It is usually given in tablets providing 60 mg of elemental iron, and women are advised to take three tablets per day throughout pregnancy. It is reported that many women do not take the tablets because of perceived adverse side effects. About 200 mg of iron which is in the form of ferrous sulphate is given for the age of 5 to 10 year children on daily or weekly basis for 2 months

**Indian Council Medical Research, (2008)**.was initiated in 1970 to control iron deficiency anemia in the vulnerable groups through daily supplements of iron-folic acid tablets. The suggested prophylactic doses of iron and folic acid respectively were 60 mg and 500 μg for pregnant women and 20 mg and 100 μg for children per day for 100 days. These tablets were distributed to the high risk groups by the local health workers. An evaluation in 11 states during 1985-86 indicated very poor coverage and performance of the Programme. There was no impact of the Programme on the prevalence of anemia in pregnant women of more than 37 weeks of gestation.

**Haider BA et al (2006)** studied nine field trials involving 15,378 women for Cochrane Systematic Review (2006) and concluded that there is no added benefit of multiple micronutrient supplementation compared with iron + folic acid supplementation.

### 2.1.3 Literature related to the effectiveness of fenugreek leaves with elemental iron on anemia

**Geetali Deori., et.al (2014)** Conducted experimental study in fenugreek leaves with its beta carotene of 19mg/100g of leaves content along with ascorbic acid 220.97mg/100g, minerals may have a positive impact in the mobilization of stored iron and increase hemoglobin levels of anemic subjects. Results show median iron absorption from the meal ingested with amaranthus leaves juice and elemental iron was 7.2%. Median iron absorption from the meal ingested with fenugreek juice was 8.7 %.( 9.8/+-6.7%, p=0.44). Iron was significantly correlated with serum ferritin concentration (p=0.02); iron absorption from the

meal included fenugreek leaves tended to correlate with transferring receptor concentration (p=0.001). They conclude fenugreek leaves with elemental iron is effective than amaranthus leaves with elemental iron.

**Vani Pasricha, Rajinder K Gupta (2014)** The dried samples of fenugreek leaves, stems (*Trigonella foenum-graecum* L.) is investigated for their potential for use as nutraceuticals. Thorough characterization of the samples demonstrated their capability as rich sources of energy, natural antioxidants, polyphenols and minerals. The fenugreek leaves showed to be good sources of protein. The samples are excellent sources of Calcium, Magnesium, Potassium, Phosphorus and moderate sources of Zinc, richer amount of iron in fenugreek leaves. The samples revealed good amounts of alkaloids followed by moderate amounts of saponins. Total phenolics and flavonoids contents were obtained for methanolic and aqueous solvent extracts for each of the samples Antioxidant activity of the extracts was estimated using ABTS scavenging assay and FRAP assay. The methanolic extracts showed good antibacterial activity in *B. subtilis*, *E. coli and P. mirabilis.* GC-MS screening and flavour analysis showed the presence of several useful compounds indicating that the samples hold the potential to be stated under “nutraceuticals”.

**Balkrishna Umarji (2012)** Studies indicate that a diet rich in antioxidant phytochemicals, such as poly-phenolics, carotenoids, flavonoids and terpenoids protects against cellular damage due to its potency to scavenge oxygen-derived free radicals Flavonoids and phenolic compounds are widely distributed in fenugreek plants and are reported to show various biological effects, including anti-inflammatory, anti-carcinogenic activities etc.Various researches have also suggested a role of flavonoids as potential iron chelators .The association between the anti-oxidative properties of food and health has been extensively investigated over the years. Natural antioxidants are also in high demand for application as nutraceuticals/ functional foods and bio-pharmaceuticals because of consumer preference.

**Lynch S., (2012)** Fortification of cereal flours may be a useful public health strategy to combat iron deficiency. Cereal flours that are used shortly after production (e.g., baking flour) can be fortified with soluble iron compounds, such as ferrous sulfate, whereas the majority of flours stored for longer periods is usually fortified with elemental iron powders to avoid unacceptable sensory changes. Elemental iron powders are well absorbed than soluble iron compounds and they vary widely in their absorption depending on manufacturing method and physicochemical characteristics. Elemental iron powders are generally less expensive than ferrous fumerate. This review evaluates the usefulness of the different elemental iron powders based on results from in vitro studies, human bioavailability studies, and efficacy studies monitoring iron status in human subjects. It concludes that, at the present time, only elemental iron can be recommended as an iron fortificant, it should be added to provide double the amount of iron.

**Megha Doshi .,et al (2012)** Have conducted evaluation and treatment of iron deficiency anemia as the first line treatment for fenugreek leaves juice is safe, cost effective and convenient. To optimize iron absorption, fenugreek leaves should be taken with elemental iron, since iron is absorbed better in an acidic environment. Furthermore, ascorbic acid reduces the oxidation of ferrous to ferric iron.

**Yadav. et.al (2012)** Conducted experimental study in fenugreek leaves to measure iron absorption in women from meals containing fenugreek leaves juice with elemental iron. In Mahastra 25 healthy women are selected.In that 25 (10 females age is 30yrs, 15 female age is 35yrs) completed the study. On two successive days, women consumed identical meals which included rajgira juice with elemental iron one day, and fenugreek leaves with elemental iron on the other, in random order. Iron absorption was measured from the red blood cell incorporation of the iron stable isotopes 14 days later. Results show median iron absorption from the meal ingested with rajgira leaves juice with elemental iron was 7.2%. Iron absorption from the meal that included rajgira leaves juice.

significantly correlated with serum ferritin concentration (p=0.47); Iron absorption from the meal included fenugreek leaves juice with elemental iron tended to correlate with transferring receptor concentration (p=0.001). They conclude fenugreek leaves juice with elemental iron is effective than rajgira leaves with elemental iron.

**Hurrell.R, (2011)** Ferrous sulfate is currently recommended for use in the fortification of foods for and women. This recommendation is based on the compound's good sensory properties and on results from isotope studies in adults that reported similar iron absorption values for ferrous sulfate and ferrous gluconate (relative bioavailability [RBV] of ferrous sulfate, 100). Lower iron status in women resulting in greater iron absorption via up regulation from ferrous sulphate but not from ferrous gluconate. Ferrous sulfate-fortified complementary foods have been demonstrated to improve iron status in iron-deficient women.

**Srivastava Kumar, & Sharma, (2011)** conducted field trials research to analyze the hemoglobin status of women in Mysore. Thirty three subjects were taken as experimental group and fed 100 gram of standardized fenugreek leaves by incorporating 10% dehydrated onion stalk for 30 days. Control group (n=40) was not given any supplementation. After 30 days of feeding experiment, the mean hemoglobin level of experimental group was ranged from 8.20±0.21 g/dl to 8.58±0.26 g/dl, hence a significant improvement was observed. However, the change in the control group was found non-significant, ranged from 7.58±0.19 g/dl to 7.67±0.21 g/dl. Hence, supplementation of dehydrated onion stalks based product fenugreek leaves can significantly improve the hemoglobin status of women.

**Motey & Lele (2010)** also reported fenugreek leaves powder to be a good source of calcium, minerals. Incorporation of fenugreek leaf powder at 3 percent and 5 percent level was found to be acceptable in cutlets and patties, while the acceptability decreased at 7 percent level. Fenugreek leaf powders incorporated

at 10 percent level of masala biscuits, masala buns, gingili chikki, wheat soy halwa, had mean acceptability scores of3.4, 3.6, 3.4 and 3.9 respectively on a five point scale. Products were found to be rich in iron, beta carotene and calcium.

**Mohan Kumar &Bhavani, (2009)** Twenty girls (20-22 years) residing in the hostel of PSG college of Arts and Science, Coimbatore selected for the study. The subjects were divided into two groups for the feeding trial. One group was given control recipe without fenugreek leaves. The experimental group was given recipe by incorporating fenugreek leaves providing 15 mg of iron was given for 100 days to the anemic adolescent girls. After completion of 100 days, the blood hemoglobin levels were measured. The mean hemoglobin levels before the feeding trial in both the control and experimental groups were found to be 10.32 g/dl and 10.6 g/dl respectively. The mean hemoglobin levels after the feeding trial in the respective groups were found to be 10.3 g/dl and 13.56 g/dl respectively. This highlighted that statistically significant increment in Hb levels of experimental group.

**Nambiar, Bhadalkar, & Daxini, (2009)** study conducted by several studies have reported the significance of fenugreek leaves as a source of vitamin C as these leaves retained 50 percent of their beta carotene on shade dehydration and the dehydrated leaves could be easily incorporated into traditional Western Indian recipes without altering their acceptability characteristics food.

**Singh & Kawatra, (2006)** Experimental study was conducted on development and nutritional evaluation of recipes prepared using fresh and dried fenugreek leaves. Pakoda, vada,namakpara, kumara, biscuit and cake were prepared with the addition of fresh and dried powder of fenugreek leaves. Protein content of the products ranged from 7.4 per cent in biscuit to 17.9 per cent in vada on dry weight basis. Ascorbic acid content ranged from 2.6 (cake) to 27.5 mg/100 g (kumara) on dry weight basis, the content being higher in products prepared with fresh fenugreek leaves. Beta-carotene content was maximum in

namakpara (368.5 mg/100 g) containing fenugreek leaf powder. Total iron content ranged from 7.9 (kumara) to 12.4 mg/100 g (vada), whereas the total zinc content varied from 2.38 mg/100 g in vada with fresh leaves to 0.42 mg/100 g in cake prepared from dried fenugreek leaves.

**Food Based Approaches with focus on Green leafy vegetables**

**Kowsalya & Vidhya, (2004)** conducted a study on Green leafy vegetables like Ariakeerai, Mullakeerai, Paruppu keerai, fenugreek leaves and drumstick leaves. The leaves were dried (sun, shade and cabinet) and their nutrient composition was assessed. From this, it can be concluded that dehydration resulted in concentration of nutrients especially micronutrients. Cabinet drying ranked first, appreciable amounts of nutrient retention was found in shade drying and sun drying.

**Value addition and organoleptic evaluation:**

**Singh & Awasthi, (2011)** conducted a study to investigate the effect of powder made from Kachnar, Drumstick, fenugreek leaves and Curry leaves incorporated in food products viz., biscuits, murukku, mathri and namakpare on sensory parameters. Green leafy vegetable powders were incorporated at 5, 10, 15 and 20 percent level and products were evaluated through organoleptically. Acceptable level of green leafy vegetables in biscuits, murukku, mathri and namakpare was 15, 10, 20 and 10 percent respectively.

## 2.2 CONCEPTUAL FRAMEWORK

A conceptual framework is a process of ideas which are framed and utilized for the development of a research design. It helps the researcher to know what data needs to be collected and gives direction to an entire process.

The study is based on the concept that administration of 100mg of elemental iron and 5gm fenugreek leaves powder mixed with 200 ml of water to give women will improve hemoglobin level. The investigator adopted the wiedenbach's art of clinical nursing (1964) as a base for developing the conceptual framework. Ernestin wiedenbach proposes helping the art of clinical nursing theory in 1964 for nursing which describes a desired situation and way to attain it. It directs action towards the explicit goal.

**THIS THEORY HAS 3 FACTORS**

**1) Central purpose**

It refers to what the nurse wants to accomplish. It is the overall goal towards which a nurse strives.

**2) Prescription**

It refers to the plan of care for clients. It will specify the nature of action that will fulfill the nurse's central purpose.

**3) Realities**

It refers to the physical, physiological, emotional and spiritual factors that come into play in situation involving nursing action. The five realities identified by Wiedenbach's are agent, recipient, goal, mean and framework.

The conceptual framework of the nursing practice according to this theory consists of three steps as followed:

Step I: Identifying the need for help

Step II:  Ministering the needed help

Step III: Validating that the need for help was met

**Step I: Identifying the need for help**

This step involves determining the need for help. The anemic women were identified based on demographic variables, inclusive and exclusive criteria, probability simple random sampling technique was used to assign the patients in experimental and control group.

**Step II:  Ministering the needed help**

100 mg of elemental iron tablet and 5gm fenugreek leaves powder mixed with 200 ml of water was given to experimental group daily in the morning after breakfast.

| | | |
|---|---|---|
| Agent | : | Investigator |
| Recipient | : | Anaemic women |
| Goal | : | To improve hemoglobin level |
| Means | : | Administered 100mg of elemental iron tablet and 5gm of Fenugreek leaves powder mixed with 200 ml of water for 14 days. |
| Framework | : | Selected women at Choolai, Chennai. |

**Step III: Validating that the need for help was met**

It is accomplished by means of post assessment of hemoglobin level. It is followed by an analysis of the findings

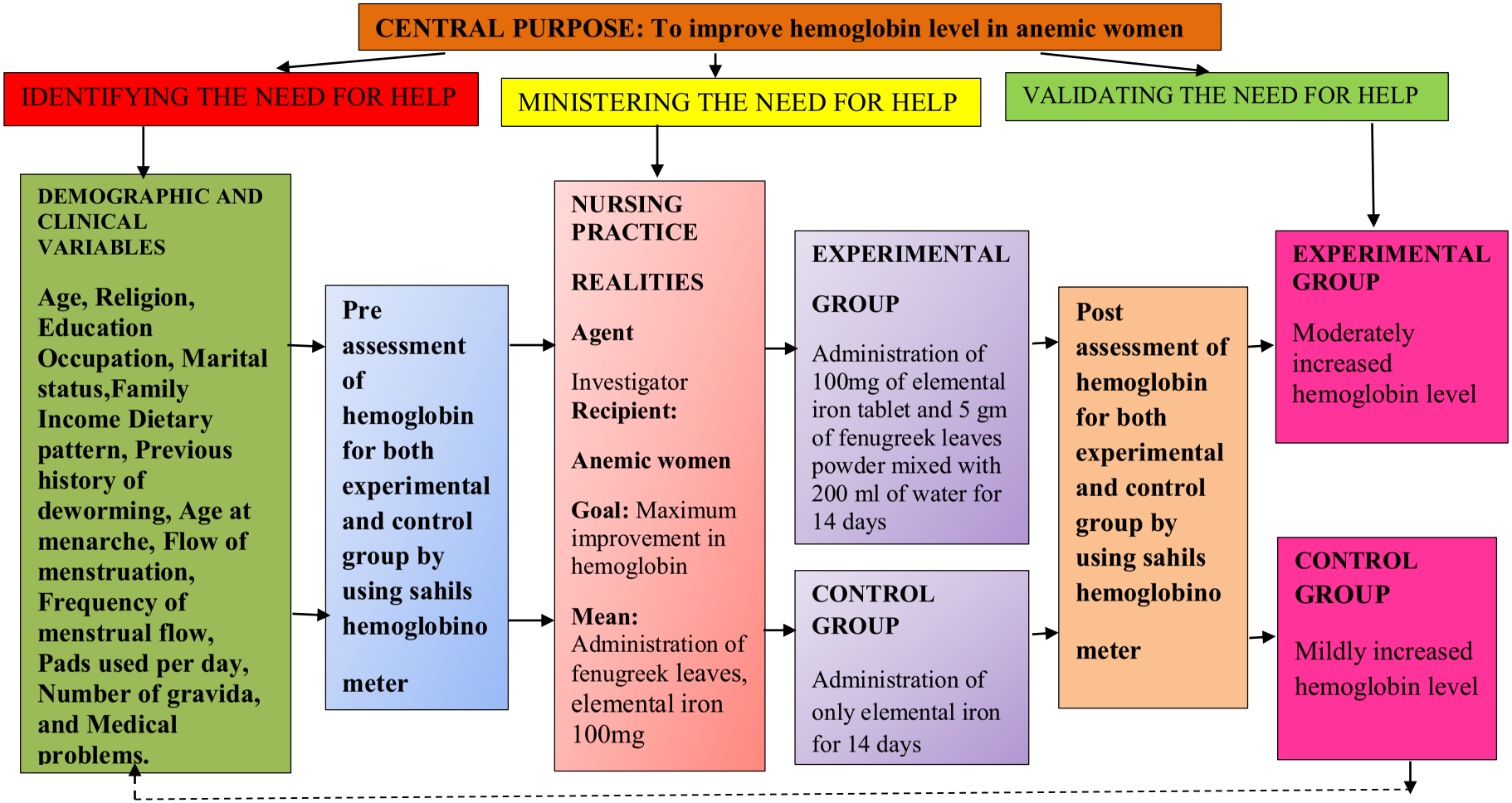



**Fig-2.1: Conceptual framework based on modified model of Wiedenbach's helping art of clinical nursing theory (1964)**

# CHAPTER - III

# METHODOLOGY

# CHAPTER- III

## RESEARCH METHODOLOGY

Research methodology provides a brief description of the method adopted by the investigator in the present study and it refers to the principles and ideas on which researcher bases their procedures and strategies. This chapter deals with the description of the methods and different steps used for collecting and organizing data such as the research approach, duration of the study, study setting, study design, study population, sample size, criteria for selection of sample, sampling technique, research variables, developing and description of tool, content validity, ethical consideration, pilot study, reliability, data collection procedure and data entering &data analysis.

### 3.1 Research approach

A research approach guides the researcher in the nature of data to be collected and the method of analysis. To accomplish the objectives of the current study quantitative research approach was chosen by the investigator.

### 3.2 Data collection period

The study was conducted for the period of 4 weeks. (16.7.15 to 15.8.15)

### 3.3 Study setting

The study was conducted in selected women at Choolai, Chennai, 3kms away from the college of nursing, Madras Medical College, Chennai. Which belongs to the north zone of Chennai Corporation and it is very near to urban health post. It has covers the population 58,744. Totally there are 16 streets in Choolai area. The College of nursing, madras medical college provides curative and preventive care to the people through students belonging to department. The setting was selected based on the feasibility of conducting the study, availability of sampling and proximity of setting to the investigator.

### 3.4 Study design

Research design is overall plans for obtaining answers to the research questions or for testing the research hypothesis. The investigator has chosen the experimental research design.

Pre-test, post-test (before, after) control group design.

RE 01 X1 02

RC 03 - 04

R - Randomization

E - Experimental Group

C - Control Group

X - Intervention

O - Observation

**3.1: Pre-test, post-test control group design.**

| Group | Pretest 01 | Treatment X | Posttest 02 |
|---|---|---|---|
| Experimental group(group-I) | Hemoglobin level checked by sahil's Hemoglobinometer | 100 mg of elemental iron and 5 gm of fenugreek leaves powder mixed with 200ml of water. | Hemoglobin level checked by sahil's Hemoglobinometer. |
| Control group ( group-II) | Hemoglobin level checked by sahil's Hemoglobinometer | Routine care 100 mg of elemental iron. | Hemoglobin level checked by sahil's Hemoglobinometer. |

### 3.5 Study population

The study population comprises of women (25-45 years) of age, in selected community area, Choolai, Chennai.

### 3.6 Sample size

In this study the sample size comprises of 60 women of Choolai, in which 30 were in experimental and 30 were in control group. The study sample comprised of women who fulfilled the inclusion and exclusion criteria.

### 3.7 sampling criterion

#### 3.7.1 Inclusion criteria

1. Women in age group 25-45 years who are willing to participate in study.
2. Women who are available during the period of data collection.
3. Women who are able to read and understand English and /or Tamil.
4. Women who have <10 gm % of hemoglobin level.

#### 3.7.2 Exclusion criteria

1. Women who are pregnant and lactating mothers.
2. Women who are not willing to consume fenugreek juice
3. Women who are having severe menstrual bleeding& other malignant problems.

### 3.8 Sampling technique

The sampling technique employed to recruit the samples for the study was simple random sampling, by lottery method was used for the present study.

The investigator conducted a survey in the Choolai area to identify the total number of anemic womens. Totally there are 16 streets in Choolai area. Survey was conducted among these 16 streets. Within 6 streets 120 samples were selected through simple random sampling. Each women in particular street had been numbered and sample had been selected by simple random sampling technique by lottery method in each street. Selected samples were who had met the inclusion criteria and by the sampling framework the participants were selected randomly and labeled as experimental group they are in the streets of

Periya thambi Street, Aandiappan Street, Avadi Srinivasan Street, and in control group they are in the streets of V.V koil,C.K.P Street, T K Mudhali Street.

### 3.9 Research variables

Independent variable : 100mg of elemental iron tablet and 5gm of fenugreek leaves powder mixed with 200 ml of water.

Dependent variable : Hemoglobin level

### 3.10 Development and description of the tool

A Structured interview schedule was developed by the investigator, based on the objectives of the study and the tool was developed after an extensive review of literature, net sources and option of the experts in the field, journals and books.

#### 3.10.1 Development of the tool

A Structured interview schedule and the tool was developed after an extensive review of literature, net sources and opinion of the experts in the field, journals and books.

#### 3.10.2 Description of the tool

The instrument consists of two sections. The tool used in this study was an interview and observation schedule on hemoglobin for women.

Section A: Demographic data of women which consists of 10 questions such as age, religion, educational status, occupational status, marital Status, income, dietary pattern, iron rich diet, previous history or deworming, if yes means when it taken.

Section B: Clinical data of women its consists of age at menarche, menstrual history, flow Of menstrual cycle, frequency of menstrual flow, pads used per day, number of gravida, and medical problems.

Section C: Bio physiologic assessment of pretest hemoglobin level of both experimental and control group and there after post interventional assessment of hemoglobin level for both the group using sahil's hemoglobinometer.

**Hemoglobin assessment**

The Investigator is to assess and record hemoglobin level by using sahil's heamoglobinometer before and after the administration of fenugreek leaves powder juice with elemental iron. Same instrument was used for both experimental and control group.

**Table 3.2: Assessment of hemoglobin level**

| **Week/date** | **Procedure** | **Hemoglobin level in gm/dl** | |
|---|---|---|---|
| **First week** | | **pretest** | **Post test** |
| **Day 1** | | **Hemoglobin checked** | |
| **Second week** | | | |
| **Day 15** | | | **Hemoglobin checked** |

**Results:**

**1.** Maximum improvement in hemoglobin level: up to 2 gm/dl

**2**. Minimum improvement in hemoglobin level: up to 1 gm/dl

### 3.11 Ethical consideration

The study objectives, intervention and data collection procedures were approved by the Research and Ethics Committee of the Madras Medical College.

### 3.12 Content validity

The content validity refers to the degree to which an instrument measures what is supposed to measure. The content of the tool was validated by one medical expert and one community health nursing expert and one statistical

expert. The expert's suggestions were incorporated and the tool was finalized and used by the investigator for the main study.

**3.13 Pilot study**

A formal permission was obtained from the director, department and preventive medicine, Madras Medical College, Chennai. The pilot study was conducted at selected urban women, Choolai, Chennai, which includes 6 clients with anemia (3 control group and 3 experimental group) after obtaining informed consent from them. The subjects who were used for the pilot study conducted were excluded for the main study. Demographic factors were collected by interview method. Pre assessment hemoglobin level was checked for both groups. Before starting the procedure T.Albendazole 400mg was given to both groups. For experimental group 100 mg of elemental iron and 5 gm fenugreek leaves powder mixed in 200ml water given daily in the morning after breakfast under the supervision of investigator whereas control group receive only 100mg of elemental iron and the post assessment hemoglobin level was checked for both groups. The post assessment hemoglobin level for the experimental group had an increase of 0.5 gm/dl, which showed significant result for the final study. Results were analyzed. The investigator found the instrument was feasible to use and further no modifications were needed before the actual implementation of the study.

**3.14 Reliability of the tool**

The reliability of the tool was established by inter rater reliability method. The obtained reliability correlation coefficient was high(r=0.83).The correlation coefficient was very high. The tool was feasible and practicable.

**Preparation**

150 grams of fenugreek leaves powder mixed with 6000 ml of water then administered 200 ml of fenugreek juice given to one anemic women.

**Intervention protocol**

| Protocol | Experimental group | Control group |
|---|---|---|
| Place | Choolai clients house | Choolai clients house |
| Intervention tool | 100 mg of elemental iron tablet and 5gm fenugreek leaves powder juice | 100mg of elemental iron tablet |
| Duration | 14 days | 14 days |
| Frequency | Once a day | Once a day |
| Time | 8am-9am | 9am-10am |
| Administered by | Researcher | Researcher |

**3.15 Data collection procedure**

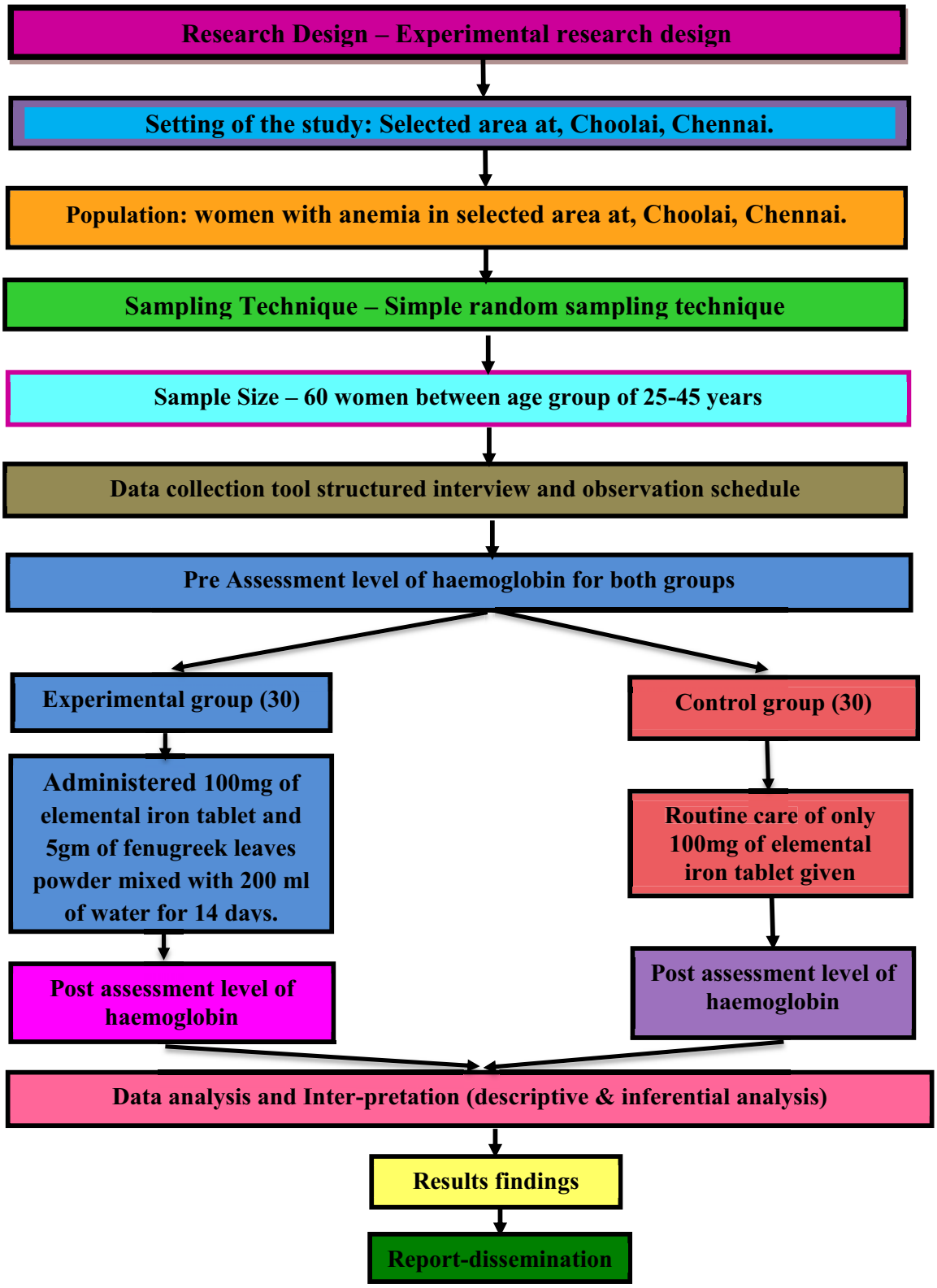
The data collection was done for a period of one month (16.7.15-15.8.15) The study was conducted in selected women of Choolai, Chennai after obtaining permission from the city health officer, corporation of Chennai and medical officer of Choolai health post. Samples were selected by simple random sampling technique who had met the inclusion criteria were informed about the research process. A self-introduction was given by the investigator and the informed written consent was obtained from the women and benefits of fenugreek leaves powder juice were explained to the participants. Clients who were having anemic women were interviewed by the tool. They were checked for hemoglobin level by sahil's hemoglobinometer. The hemoglobin findings were informed to the clients under study. The objectives and purpose of study was explained and confidentiality was maintained. Before starting the procedure tablet albendazole 400mg was given. The data collection procedure was done for a period of 4 weeks and the time taken for data collection from each women was 10-15 mts and 5-10 mts for doing blood test for each women and the investigator selected 60 samples (30 participants in experimental group and 30 in control group) Pretest hemoglobin level was assessed by sahil's method in both groups, for experimental group 100 mg of elemental iron and 5gm fenugreek leaves

powder added in 200ml of water was given daily morning 14 days after breakfast under the supervision of investigator and post assessment was conducted on 15$^{th}$day in both experimental and control group. The samples correlated well and participated willingly in the study.

### 3.16 Data entering & data analysis

Data entering is the summarize demographic questions answers, pretest and posttest value both experimental and control group is entering into excel sheet, organize and arrange the data for analysis. Analysis enables the researcher to reduce, summarize, organize, evaluate, interpret and communicate numerical information to obtain answer to research questions. Data analysis was done on the objectives of the study. The data were analyzed using SPSS descriptive statistics like frequency distribution, percentage distribution, mean standard deviation and inferential statistics like standard deviation, chi-square test, independent t- test, paired t- test. The significant findings were expressed in the form of tables and figures $p<0.05$ was considered statistically significant.

**Figure 3.1: Schematic representation of research methodology**



# CHAPTER - IV

# DATA ANALYSIS

# &

# INTERPRETATION

# CHAPTER –IV

## DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of collected data from 60 samples of women with anaemia to assess and compare the effectiveness of fenugreek leaves with elemental iron and elemental iron alone on anaemia among women residing in selected community at Choolai, Chennai.

**Organization of data**

The findings of the study were grouped and analysed under the following sections.

**Section- A:**

Frequency and percentage distribution of demographic and clinical variables of women in experimental and control group.

**Section – B:**

Assessment of pre-test haemoglobin level among women in the experimental and control group.

**Section- C:**

Assessment of post-test haemoglobin level among women in the experimental and control group.

**Section-D:**

Compare the experimental and control group haemoglobin among women.

**Section- E:**

Effectiveness of fenugreek leaves with elemental iron on anaemia among

women in experimental group.

**Section –F:**

To associate certain demographic and clinical variables with increased haemoglobin level among women in experimental and control group.

**Section- A:** Frequency and percentage distribution of demographic and clinical variables of women in experimental and control group.

**Table 4.1 :** Distribution of demographic variables of women with anemia

| Demographic variables | | Group (N=60) | | | | Total | In % | Chi square test |
|---|---|---|---|---|---|---|---|---|
| | | Experimental | | Control | | | | |
| | | F | In % | F | In % | | | |
| Age | 25-30 yrs | 9 | 30 | 12 | 40 | 21 | 35 | $\chi2$=1.419 p=0.70 |
| | 31 -35 yrs | 7 | 23.3 | 7 | 23.3 | 14 | 23.3 | |
| | 36 -40 yrs | 8 | 26.7 | 6 | 20.0 | 14 | 23.3 | |
| | 41-45 yrs | 6 | 20.0 | 5 | 16.7 | 11 | 18.3 | |
| Religion | Hindu | 13 | 43.3 | 14 | 46.7 | 27 | 45 | $\chi2$=2.59 p=0.45 |
| | Christian | 8 | 26.7 | 7 | 23.3 | 15 | 25 | |
| | Muslim | 8 | 26.7 | 5 | 16.7 | 13 | 21.7 | |
| | Others | 1 | 3.3 | 4 | 13.3 | 5 | 8.3 | |
| Educational Status | No formal education | 5 | 16.7 | 6 | 20.0 | 11 | 18.3 | $\chi2$=1.98 p=0.73 |
| | Primary | 5 | 16.7 | 7 | 23.3 | 12 | 20 | |
| | High school | 10 | 33.3 | 8 | 26.7 | 18 | 30 | |
| | HSc | 5 | 16.7 | 5 | 16.7 | 10 | 16.6 | |
| | Graduate | 5 | 16.7 | 4 | 13.3 | 9 | 15 | |
| Occupation | Home maker | 13 | 43.3 | 10 | 33.3 | 23 | 38.3 | $\chi2$=1.07 p=0.78 |
| | Govt employee | 5 | 16.7 | 4 | 13.3 | 9 | 15 | |
| | Private employee | 6 | 20.0 | 8 | 26.7 | 14 | 23.3 | |
| | Self-employee | 6 | 20.0 | 8 | 26.7 | 14 | 23.3 | |
| Marital status | Married | 16 | 53.3 | 15 | 50 | 31 | 51.7 | $\chi2$=0.50 p=0.91 |
| | Unmarried | 5 | 16.7 | 7 | 23.3 | 12 | 20 | |
| | Divorced | 5 | 16.7 | 5 | 16.7 | 10 | 16.7 | |
| | Widower | 4 | 13.3 | 3 | 10 | 7 | 11.7 | |
| Family income | < Rs.4726 | 5 | 16.7 | 7 | 23.3 | 12 | 20 | $\chi2$=0.63 p=0.89 |
| | Rs.4727-7877 | 6 | 20.0 | 5 | 16.7 | 11 | 18.3 | |
| | Rs.7878-11816 | 7 | 23.3 | 8 | 26.7 | 15 | 25 | |
| | >Rs.11817 | 12 | 40 | 10 | 33.3 | 22 | 36.7 | |
| Dietary habits | Vegetarian | 12 | 40 | 13 | 43.3 | 25 | 41.7 | $\chi2$=0.198 p=1.0 |
| | Non-Vegetarian | 18 | 60.0 | 17 | 56.7 | 35 | 58.3 | |
| Food rich in iron | Drum stick | 8 | 26.7 | 7 | 23.3 | 15 | 25 | $\chi2$=0.68 p=0.87 |
| | Dates | 11 | 36.7 | 10 | 33.3 | 21 | 35 | |
| | Fenugreek leaves | 8 | 26.7 | 7 | 23.3 | 15 | 25 | |
| | Jaggery | 3 | 10 | 6 | 20.0 | 9 | 15 | |
| History of deworming | Yes | 12 | 40 | 14 | 46.7 | 26 | 43.3 | $\chi2$=0.27 p=0.60 |
| | No | 18 | 60 | 16 | 53.3 | 34 | 56.7 | |
| If yes, means when | <3 month | 8 | 26.7 | 7 | 23.3 | 15 | 25 | $\chi2$=1.24 p=0.53 |
| | <6 month | 8 | 26.7 | 11 | 36.7 | 19 | 31.6 | |
| | More than 6 month | 14 | 46.7% | 12 | 40 | 26 | 43.3 | |

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

**Age**

Most of the women in experimental group 30%(9) were in the age group of 25-30 years, 23.3%(7) were in the age group of 31-35 years,26.7%(8) were in the age group of 36-40 years , 20%(6) were in the age group of 41-45 years, and in the control group 40%(12) were in the age group of 25-30 years, 23.3%(7) were in the age group of 31-35 years,20%(6) were in the age group of 36-40 years , 16.7%(5) were in the age group of 41-45 years.

**Religion**

On the basis of religion majority of the women 43.3%(13) were Hindus, 26.7%(8) were Christian 26.7%(8) were Muslims, 3.3%(1) were other religion in the experimental group and in the control group 46.7%(14) were Hindus, 23.3%(7) were Christian 16.7%(5) were Muslims, 13.3%(4) were other religion.

**Education**

On considering the educational status of the women 16.7%(5) women had no formal education 16.7%(5) women had primary education, 3.3%(10) women had high school education,16.7%(5) women had higher secondary education, 16.7%(5) women are graduate, in the experimental group and in the control group 20.0%(6) women had no formal education,23.3%(7) women had primary education, 26.7%(8) women had high school education,16.7%(5) women had higher secondary,13.3%(4) women are graduate,

**Occupation**

On the basis of occupation majority of the women 43.3%(13) were homemaker, 16.7%(5) were government employee,20.0%(6)were private employee ,20.0%(6)were self-employee in the experimental group and in the control group were 33.3%(10) were homemaker, 13.3%(4) were government employee,26.7%(8) were private employee ,26.7%(8) were self-employee.

**Marital status**

Based on marital status majority of the women 53.3% (16) were married, 16.7%(5) were unmarried, 16.7%(5) were divorced, 13.3%(4) were widower in the experimental group and in control group 50% (15) were married, 23.3%(7) were unmarried, 16.7%(5) were divorced, 10%(3) were widower.

**Family income**

In case of family income 16.7% (5) were earn between,< Rs.4726, 20.0% (6) were earn between Rs.4727-7877,23.3% (7) were between Rs.7878-11816, 40% (12) were earn more than Rs.11817 in the experimental group and in control group 23.3% (7) were earn between < Rs.4726,16.7%(5) were earn between Rs.4727-7877, 26.7%(8) were between Rs.7878-11816, 33.3%(10) were earn more than Rs. 11817.

**Dietary habits**

Based on dietary habits majority of the women follows non vegetarian 60.0%(18),and 40%(12) were vegetarian in the experimental group and 43.3%(13) were follows vegetarian ,56.7%(17) were non vegetarian in the control group.

**Food rich in iron**

Regarding knowledge about food rich in iron 26.7%(8) were said drum stick,36.7%(11) were said dates,26.7%(8) were said fenugreek leaves, 10%(3) were said jaggery in experimental group and in control group 23.3%(7) were said drum stick, 10%(3) were said dates, 23.3%(7) were said fenugreek leaves, 20.0%(6) were said jaggery.

**Deworm history**

In experimental group 40.0% (12) were dewormed previously,60.0% (18) were not dewormed previously and in the control group 53.3% (16) were dewormed previously,46.7%(14)were not dewormed previously .

**Deworm duration history**

In experimental group 26.7%(8) were dewormed <3month, 26.7%(8) were dewormed<6 month ,46.7%(14) were dewormed more than 6 month and in the control group 23.3%(7) were dewormed <3month,) 36.7% (11) were dewormed<6 month,40%(12) were dewormed more than 6 month.

There is no statistically significant variation in the demographic variables of clients in experimental group and control group.

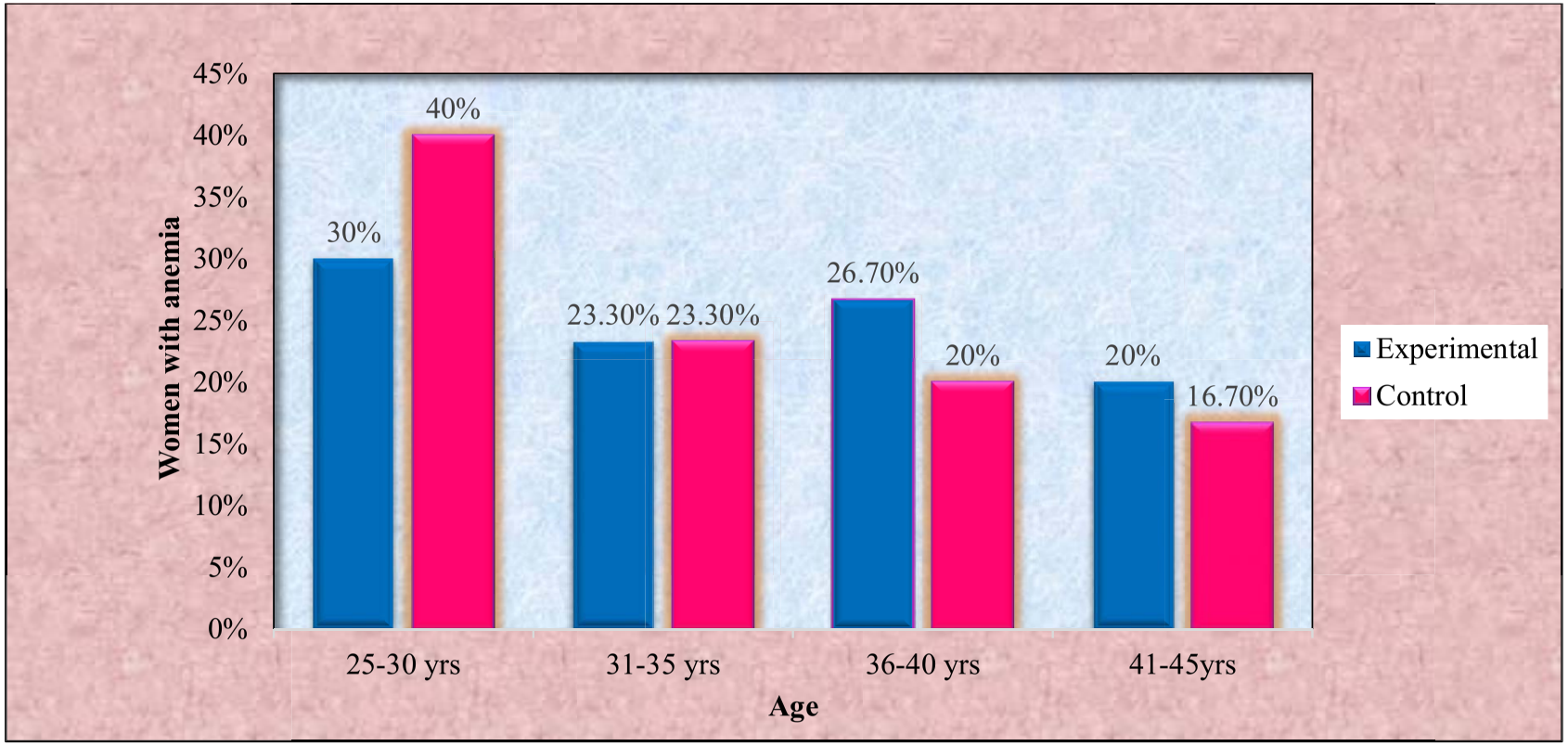



Figure-4.1: Age wise distribution of women with anemia.

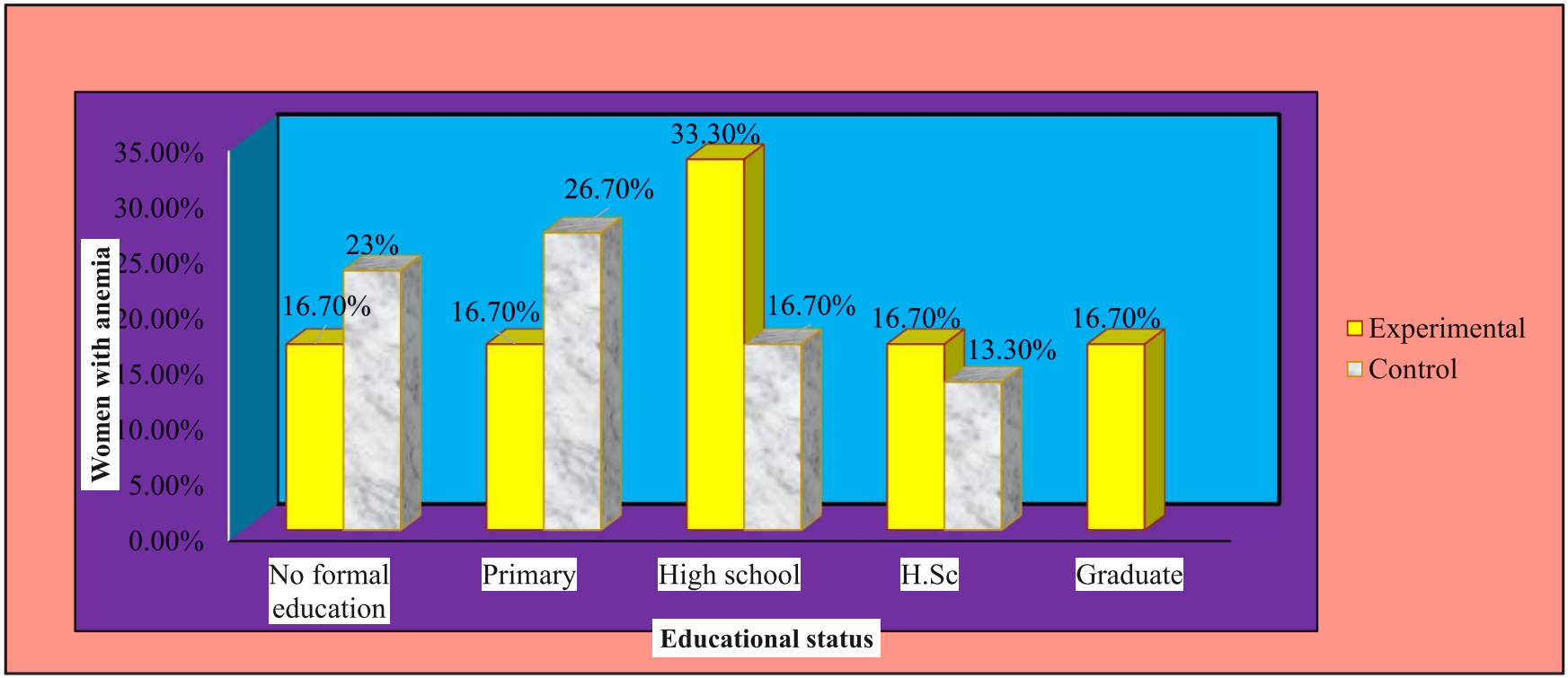



Figure 4.2: Educational status wise distribution of women with anemia

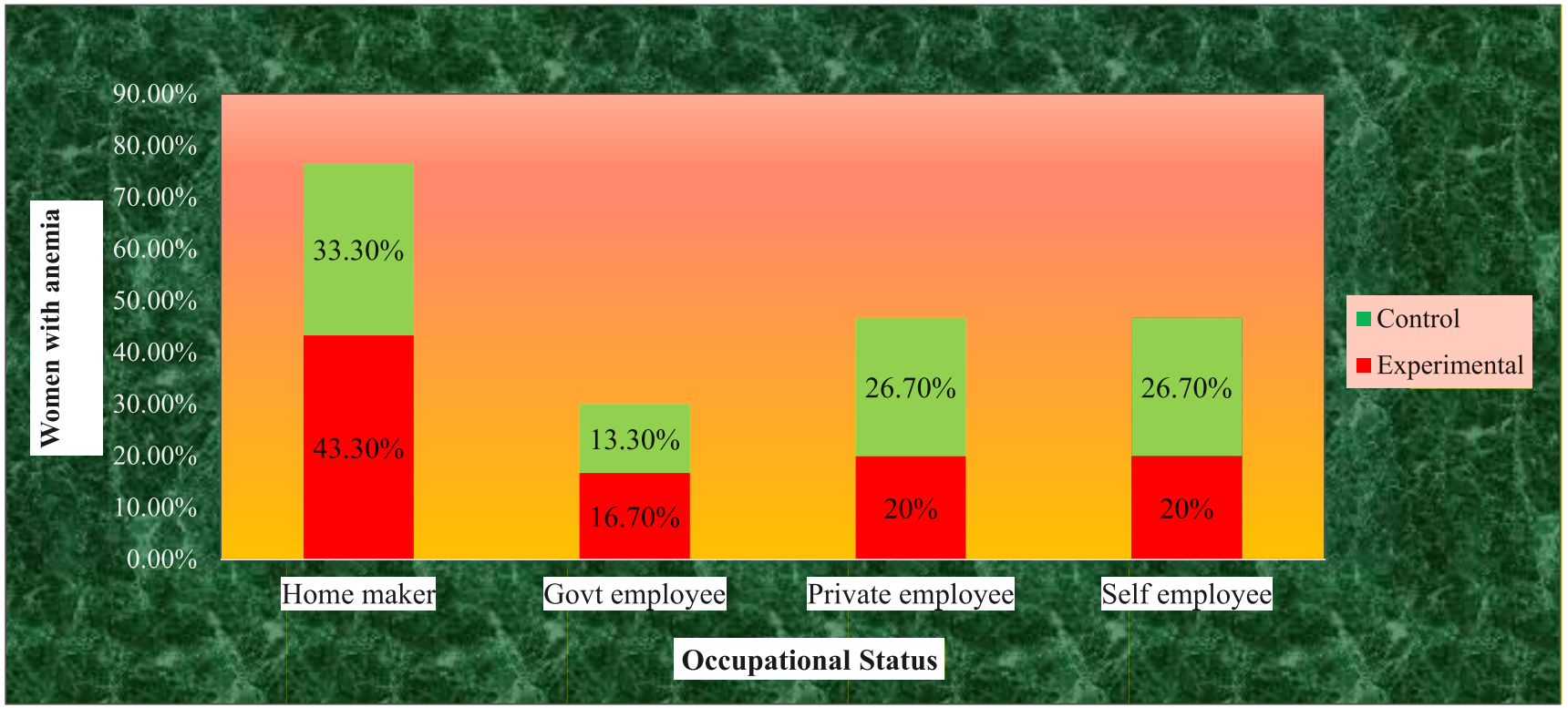



Figure 4.3 Occupational status wise distribution of women with anemia

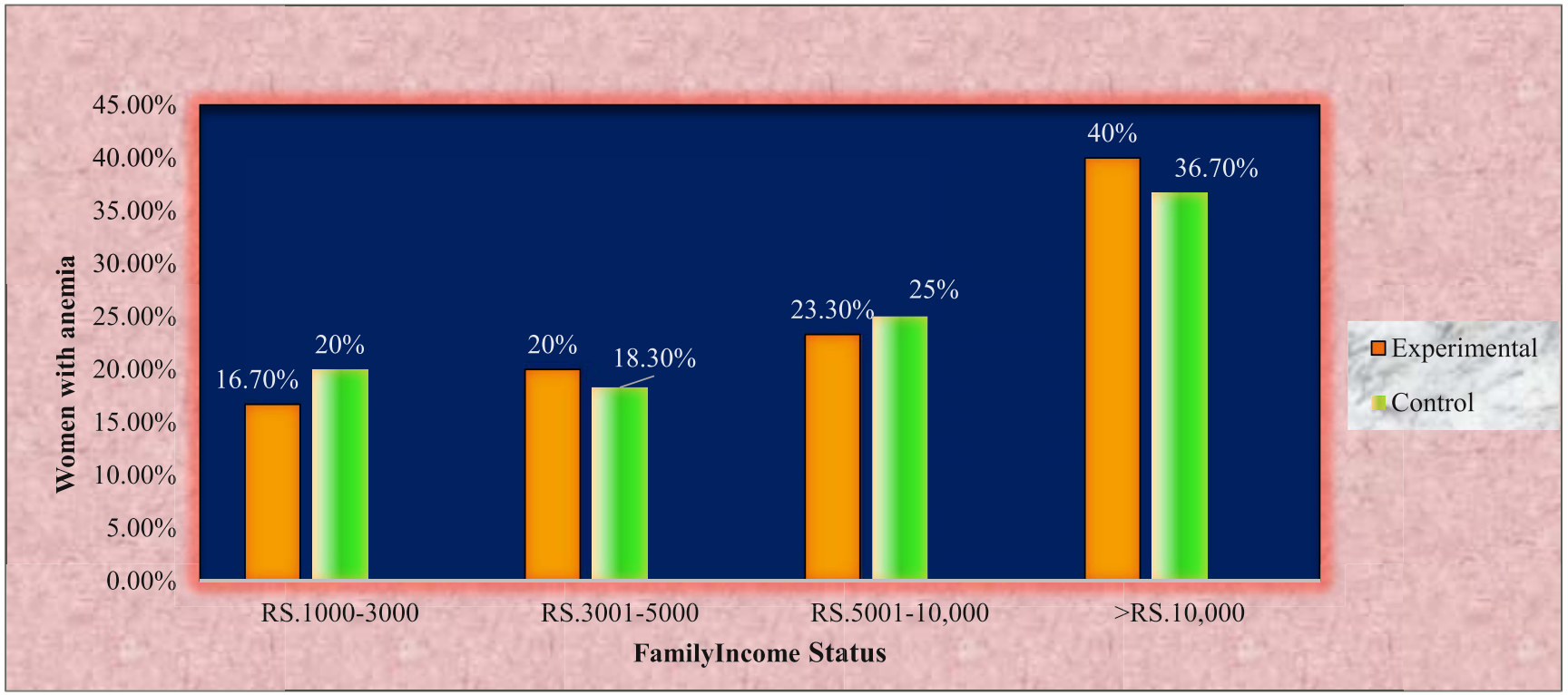



Figure 4.4: Family Income status wise distribution of women with anemia.

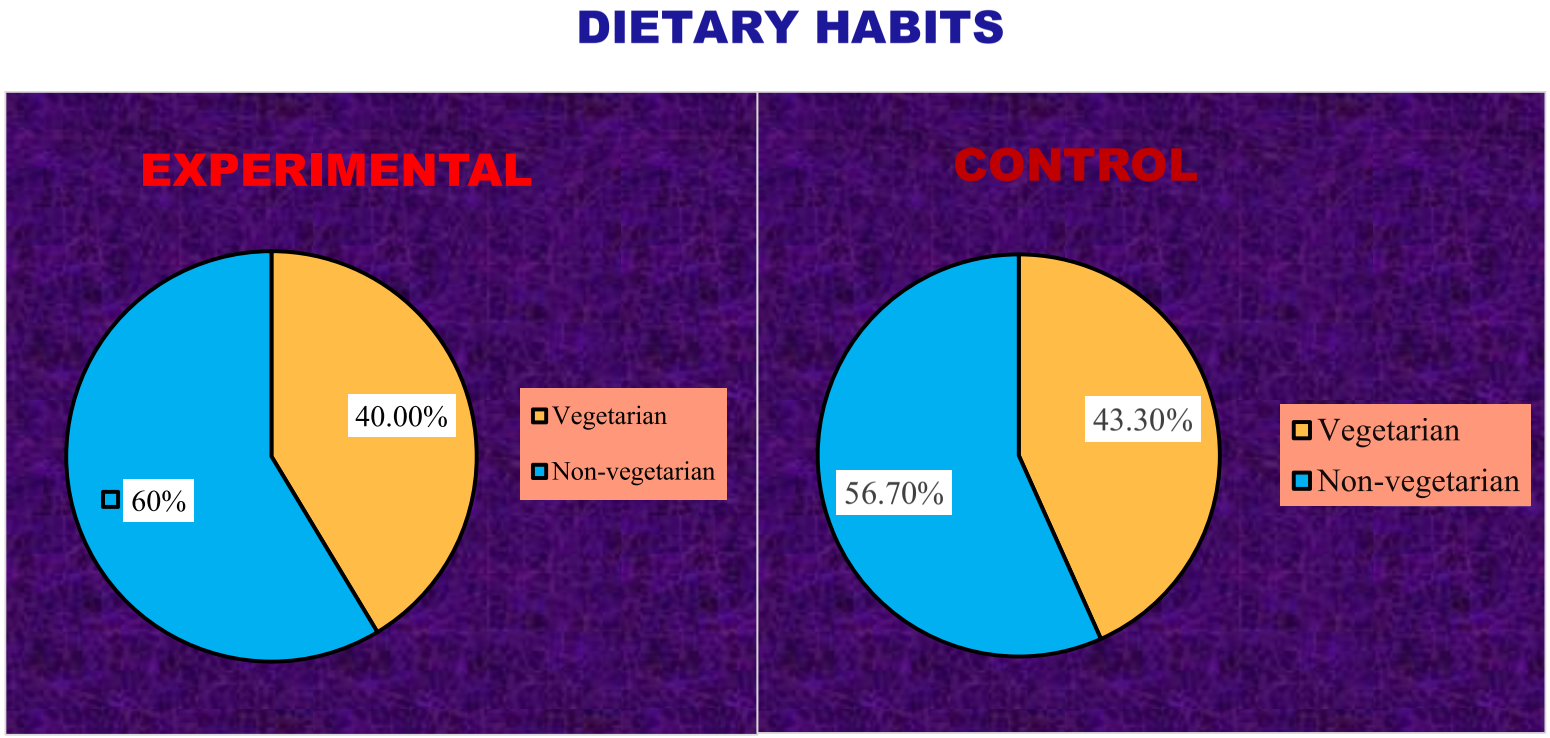



Figure 4.5: Dietary pattern wise distribution of women with anemia.

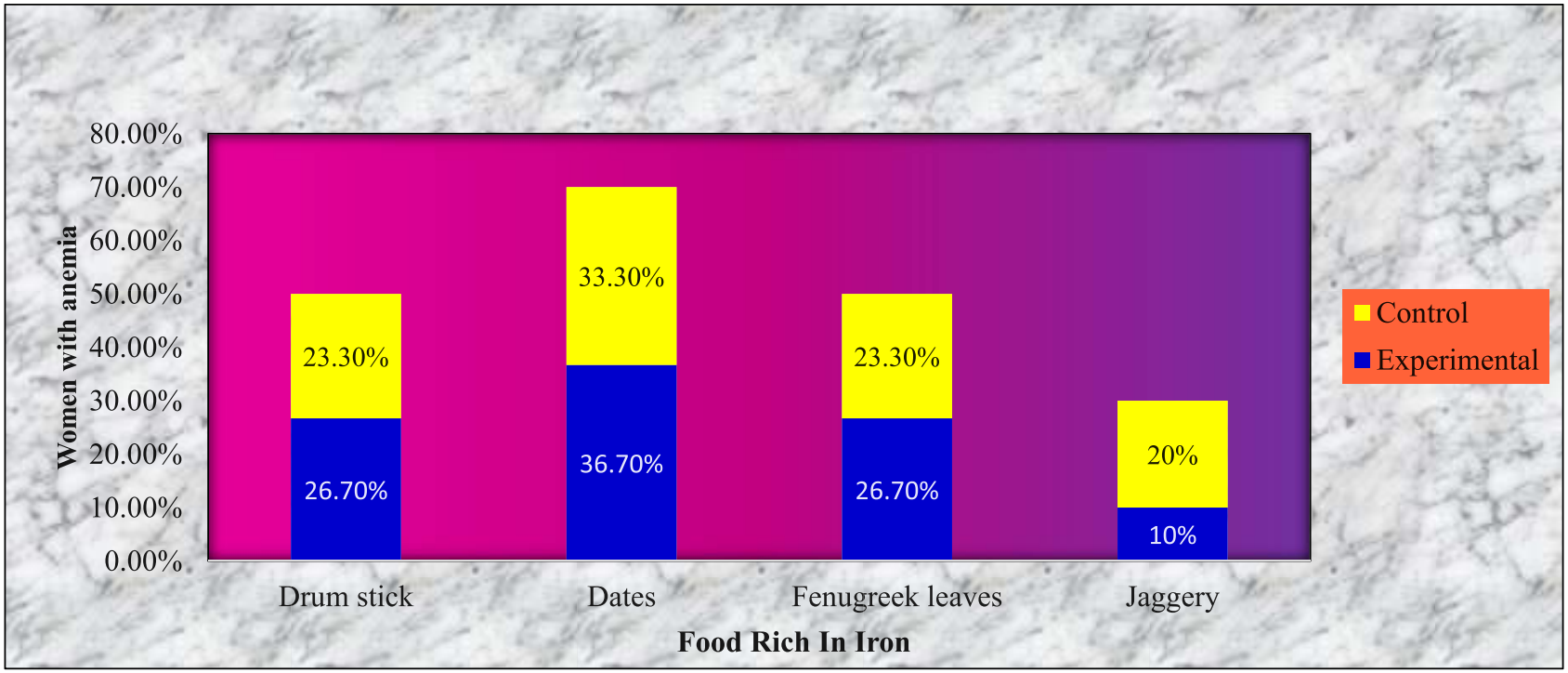



Figure 4.6: Food rich in iron wise distribution of women with anemia.

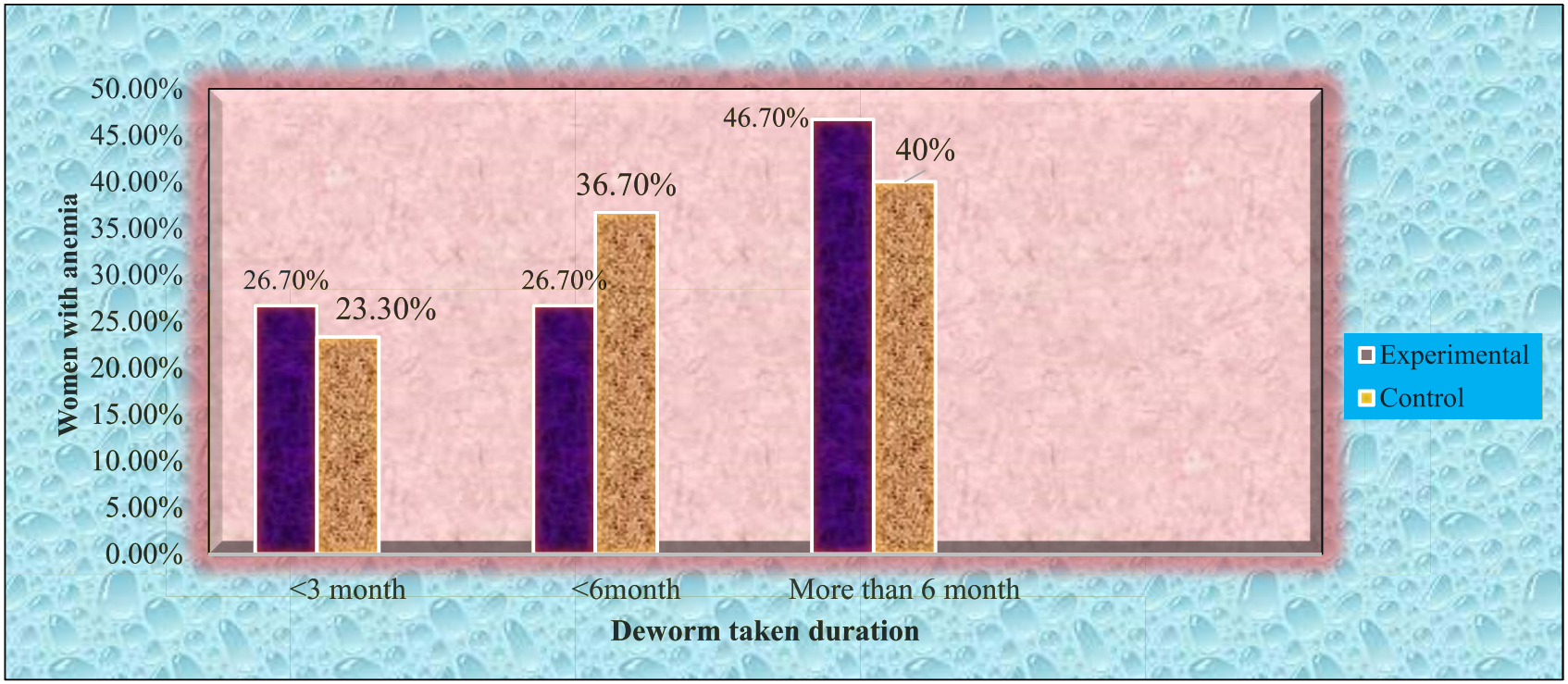



Figure 4.7 : Duration of deworm taken wise distribution of women with anemia

**Table 4.2 : Distribution of clinical variables of women with anaemia**

| Clinical variables | | Group (N=60) | | | | Total | In % | Chi square test |
|---|---|---|---|---|---|---|---|---|
| | | Experimental | | Control | | | | |
| | | F | In % | F | In % | | | |
| Age at menarche | 10 -12 yrs | 8 | 26.7 | 9 | 30 | 17 | 28.3 | $\chi 2=0.42$ p=0.8 |
| | 13 -15 yrs | 15 | 50 | 16 | 53.3 | 31 | 51.7 | |
| | 16 -18 yrs | 7 | 23.3 | 5 | 16.7 | 12 | 40 | |
| Menstrual history | Regular | 17 | 56.7 | 19 | 63.3 | 36 | 60 | $\chi 2=0.27$ p=0.5 |
| | Irregular | 13 | 43.3 | 11 | 36.7 | 24 | 40 | |
| Flow of menstruation | <5 days | 19 | 63.3 | 18 | 60 | 37 | 61.7 | $\chi 2=0.07$ p=0.79 |
| | > 5 days | 11 | 36.7 | 12 | 40 | 23 | 38.3 | |
| Frequency of menstrual flow | <28 days | 10 | 33.3 | 8 | 26.7 | 18 | 30 | $\chi 2=0.36$ p=0.83 |
| | 28 days | 13 | 43.3 | 15 | 50 | 28 | 46.7 | |
| | >28 days | 7 | 23.3 | 7 | 23.3 | 14 | 23.3 | |
| Pads used/day | 2-4 pads/day | 14 | 46.7 | 13 | 43.3 | 27 | 45 | $\chi 2=0.29$ p=0.86 |
| | 5-8 pads/day | 11 | 36.7 | 11 | 36.7 | 22 | 36.6 | |
| | 9-12 pads/day | 5 | 16.7 | 6 | 20.0 | 11 | 18.3 | |
| Number of gravida | No | 7 | 23.3 | 7 | 23.3 | 14 | 23.3 | $\chi 2=1.49$ p=0.82 |
| | One | 6 | 20.0 | 3 | 10 | 9 | 15 | |
| | Two | 5 | 16.7 | 6 | 20.0 | 11 | 18.3 | |
| | Three | 4 | 13.3 | 5 | 16.7 | 9 | 15 | |
| | More than three | 8 | 26.7 | 9 | 30 | 17 | 28.3 | |
| Medical problems | No | 19 | 63.3 | 18 | 60 | 37 | 61.7 | $\chi 2=0.57$ p=0.9 |
| | Diabetes mellitus | 4 | 13.3 | 6 | 20.0 | 10 | 16.7 | |
| | Cardiac problems | 4 | 13.3 | 3 | 10 | 7 | 11.7 | |
| | Others specify | 3 | 10 | 3 | 10 | 6 | 10.0 | |

* Significant at P≤0.05 ** highly significant at P≤0.01

*** Very high significant at P≤0.001.

**Menarche age**

Regarding women are attained menarche 26.7%(8) were in the age group 10-12 years, 50.0%(15) were in the age group of 13-15 years, 23.3%(7) were in the age group of 16-18 years in the experimental group and in control group 30%(9) in the age group of 10-12 years, 53.3%(16) were in the age group of 13-15 years, 16.7%(5) were in the age group of 16-18 years.

**Menstrual history**

Regarding menstrual history 56.7% (17) were getting regular menses, 43.3% (13) were getting irregular menses in the experimental group and in the control group 63.3% (19) were getting regular menses, 36.7%(11) were getting irregular menses.

**Flow of menstruation**

Regarding Flow of menstrual cycle 63.3% (19) women had menses flow <5 days, 36.7% (11) women had menses flow >5 days, in the experimental group and in the control group 60% (18) women had menses flow <5 days, 40%(12) women had menses flow >5 days.

**Frequency of menstrual flow**

Frequency of menstrual flow 33.3%(10) were getting less than 28 days, 43.3%(13) were getting within 28 days, 23.3%(7) were getting more than 28 days in the experimental group and in the control group 26.7%(8) were getting less than 28 days, 50.0%(15) were getting within 28 days, 23.3%(7) were getting more than 28 days.

**Pads used/day**

Regarding pads used/day 46.7%(14) were used between 2-4 pads/day,36.7%(11) were used between used 5-8 pads/day, 16.7%(5)were used between 9-12 pads/day in the experimental group and in control group 43.3%(13) were used between 2-4 pads/day,36.7%(11) were used between 5-8 pads/day, 20.0%(6) were used between 9-12 pads/day.

**Number of gravida histroy**

Based on the number of gravida histroy in experimental group 23.3%(7) women are no gravida histroy, 20.0%(6) women are one gravida histroy, 16.7%(5) women are two gravida histroy, 13.3%(4) women had three gravida histroy, 26.7%(8) women are more than three gravida histroy and in control

group 23.3%(7) women are no gravida histroy, 10%(3) women were one gravida histroy, 20.0%(6) women are two gravida histroy, 16.7%(5) women are three gravida histroy, 30%(9) women are more than three gravida histroy.

**Medical problems**

Regarding women had medical problems in experimental group 63.3%(19) women had no medical problems 13.3%(4) women had diabetes mellitus, 13.3%(4) women had cardiac problems, 10%(3) women had other problems and in the control group 60%(18) women had no medical problems, 20.0%(6) women had diabetes mellitus, 10%(3) women had cardiac problems, 10%(3) women had other problems.

There is no statistically significant variation in the clinical variables of clients in experimental group and control group.

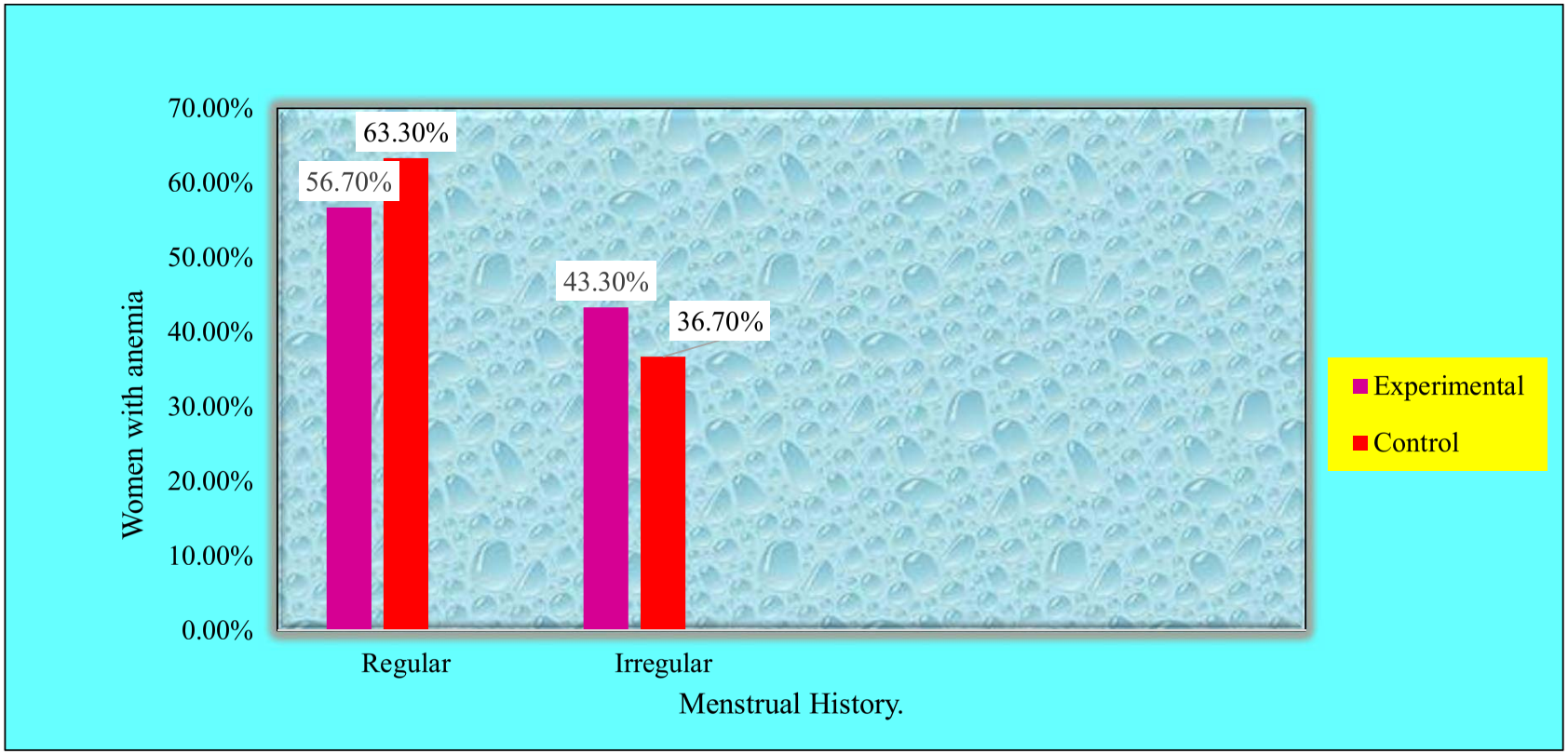



Figure 4.8 : Menstrual history wise distribution of women with anemia.

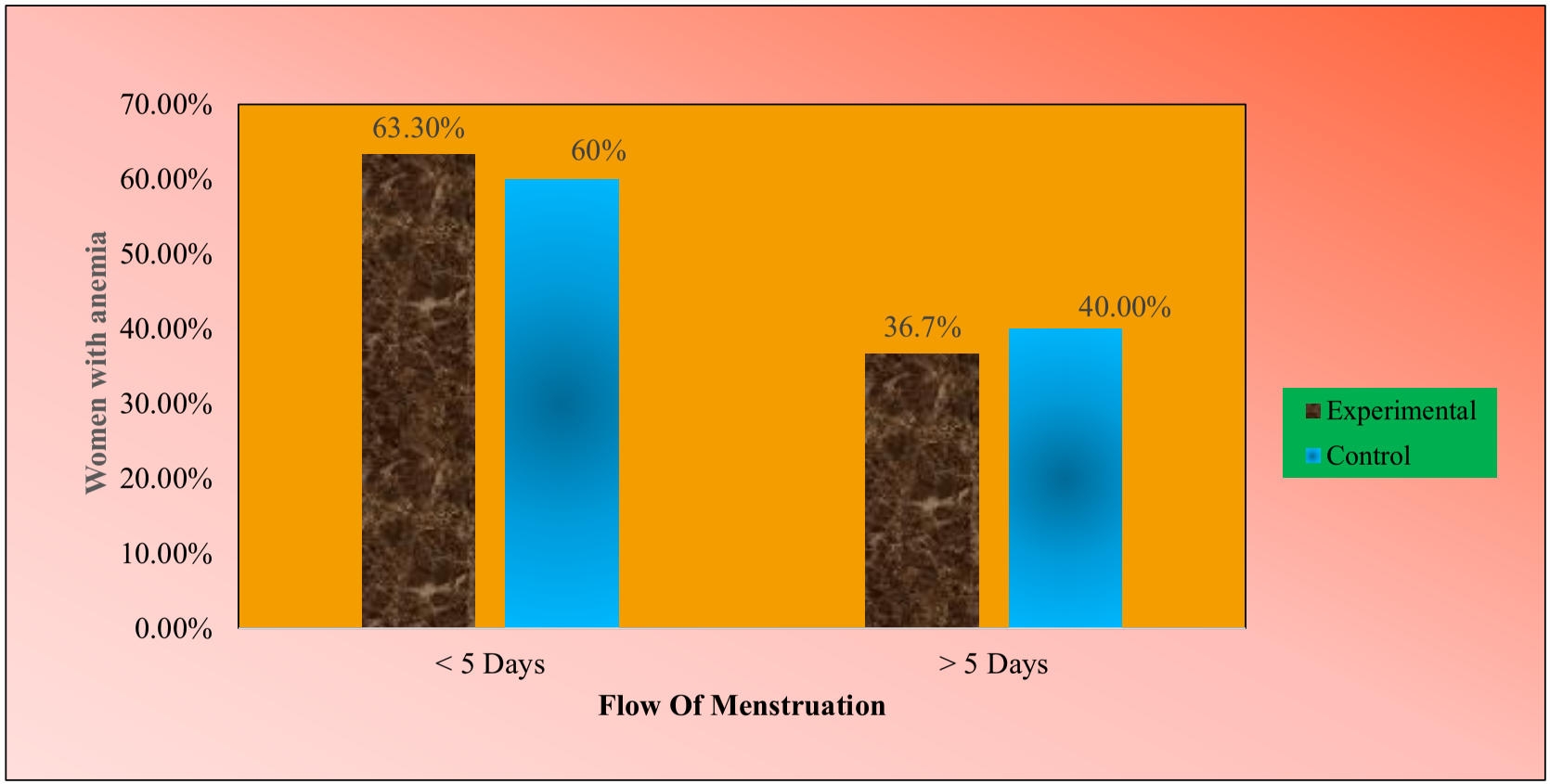



Figure 4.9 : Flow of menstruation in anaemic women.

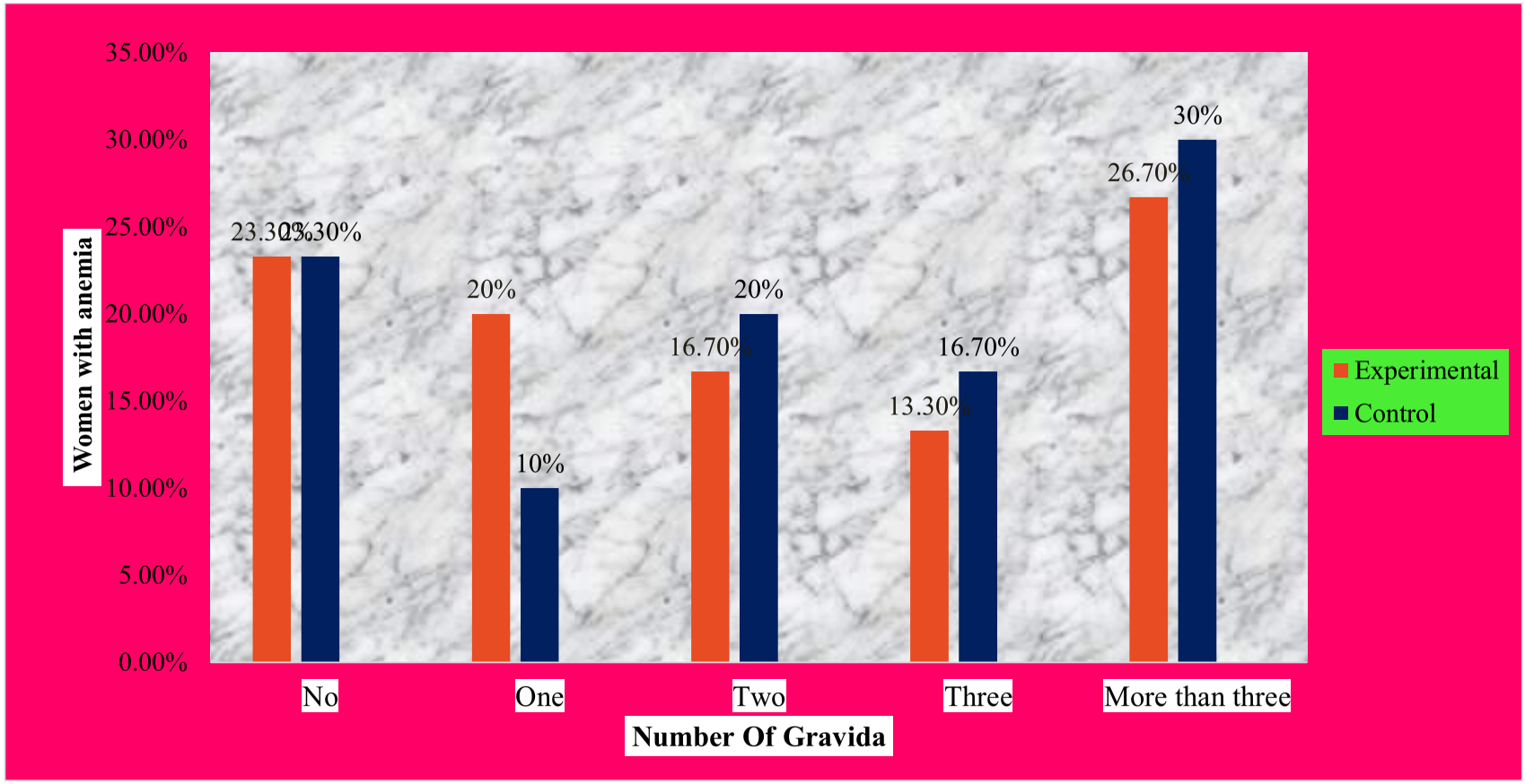



Figure 4.10 : Number of gravida wise distribution of women with anemia.

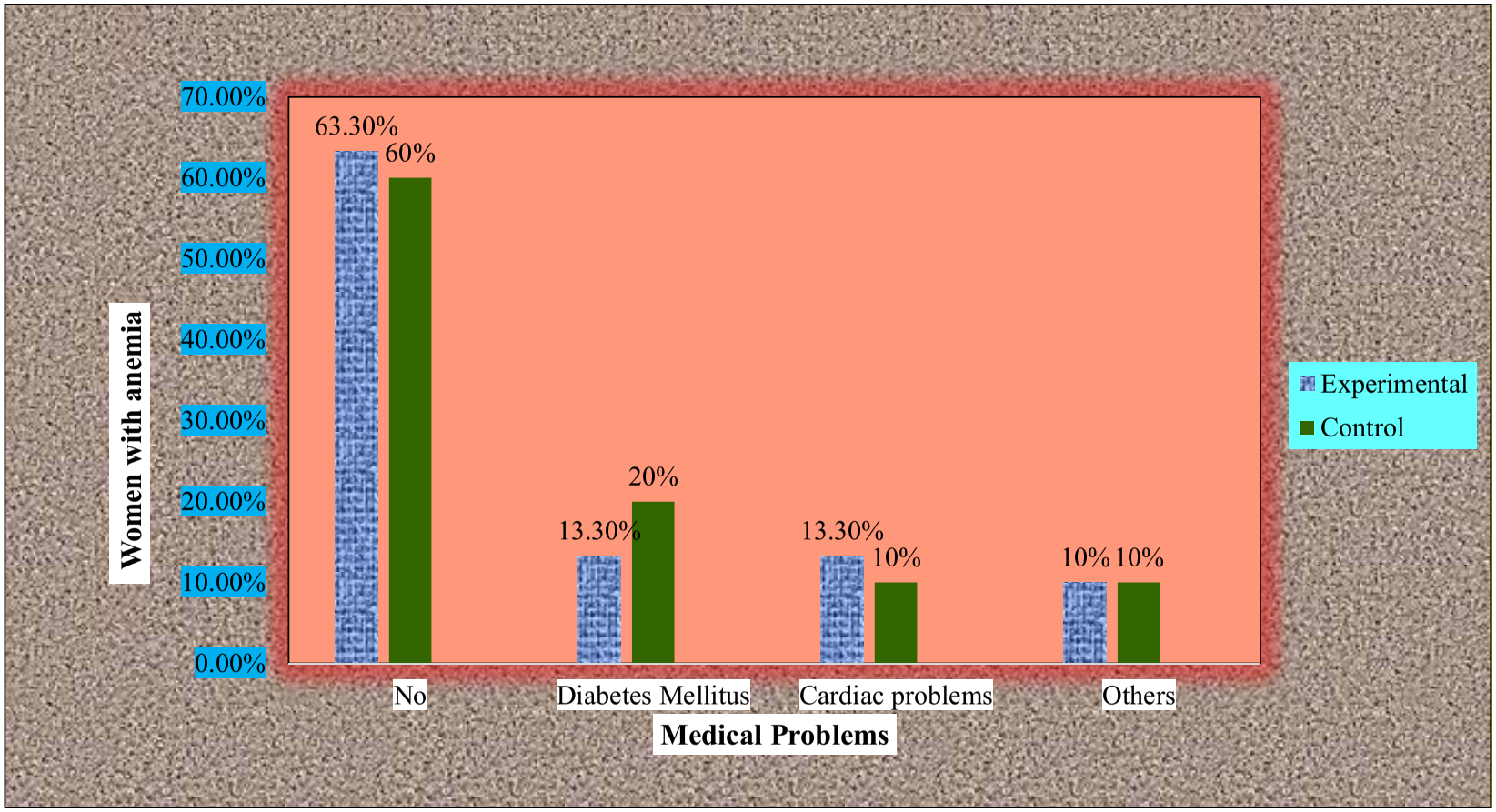



Figure 4.11 : Medical problems among anemic women.

**Section B: Assessment of pre-test haemoglobin level among women in the experimental and control group.**

**Table 4.3: Pretest level of haemoglobin (N=60)**

| Level of anaemia | Group | | | | Chi-square test |
|---|---|---|---|---|---|
| | Experimental | | Control | | |
| | No.of women | In% | No. of women | In% | |
| No anaemia | 0 | 0.0 | 0 | 0.0 | $\chi 2=0.75$ |
| Mild | 3 | 10 | 5 | 16.7 | P=0.85 |
| Moderate | 15 | 50 | 15 | 50 | |
| Severe | 9 | 30 | 8 | 26.7 | Not Significant |
| Life threatening | 3 | 10 | 2 | 6.7 | |
| Total | 30 | 100 | 30 | 100 | |

* Significant at P≤0.05 ** highly significant at P≤0.01

*** Very high significant at P≤0.001

The above table reveals that the pre-test level of haemoglobin among women both group I and group II. In group I, none of the women are not in no anaemia category.10% (3) of women had mild anaemia, 50% (15) of women had moderate anaemia and 30 %( 9) of women had severe anaemia, 10% (3) women had life threating anaemia, In group II, none of women had not in no anaemia category, 16.7% (5) of women had mild anaemia, 50 % (15) of women had moderate anaemia and 26.7% (8) of them had severe anaemia, 6.7% (2) women had life threating anaemia.

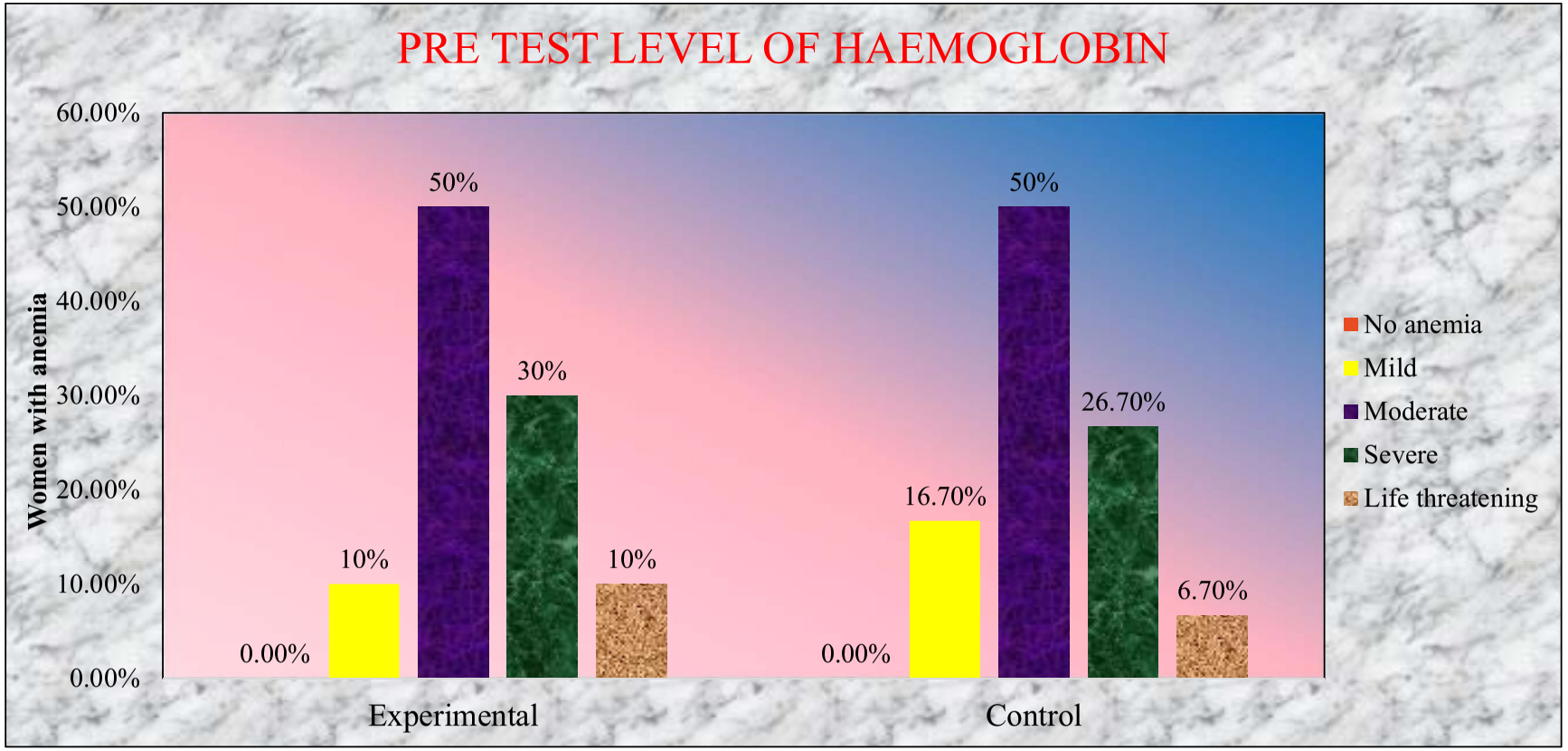



Figure 4.12 : Frequency percentage of pre-test haemoglobin level

**Section- C: Assessment of post-test haemoglobin level among women in the experimental and control group.**

**Table 4.4: Post-test level of haemoglobin (N=60)**

| Level of anaemia | Experimental group | | Control group | | Chi-square test |
|---|---|---|---|---|---|
| | No. of women | In % | No. of women | In % | |
| No anaemia | 4 | 13.3 | 0 | 0.0 | $\chi 2=7.99$ |
| Mild | 17 | 56.7 | 12 | 40 | P=0.01** |
| Moderate | 8 | 26.7 | 15 | 50 | Significant |
| Severe | 1 | 3.3 | 3 | 10 | |
| Life threatening | 0 | 0.0 | 0 | 0.0 | |
| Total | 30 | 100.0 | 30 | 100.0 | |

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

The above table reveals that the post-test level of haemoglobin among women both group I and group II. In group I, 13.3% (4) of women are not anaemic, 56.7 %( 17) of women had mild anaemia, 26.7% (8) of women had moderate anaemia and 3.3% (1) of women had severe anaemia and none of the women had life threatening anaemia. In group II, 0.0% (0) of them women had not anaemic, 40.0 %( 12) of women had mild anaemia, 50.0 %( 15) of women had moderate anaemia and 10 %( 3) of women had severe anaemia, none of them women had life threatening anaemia.

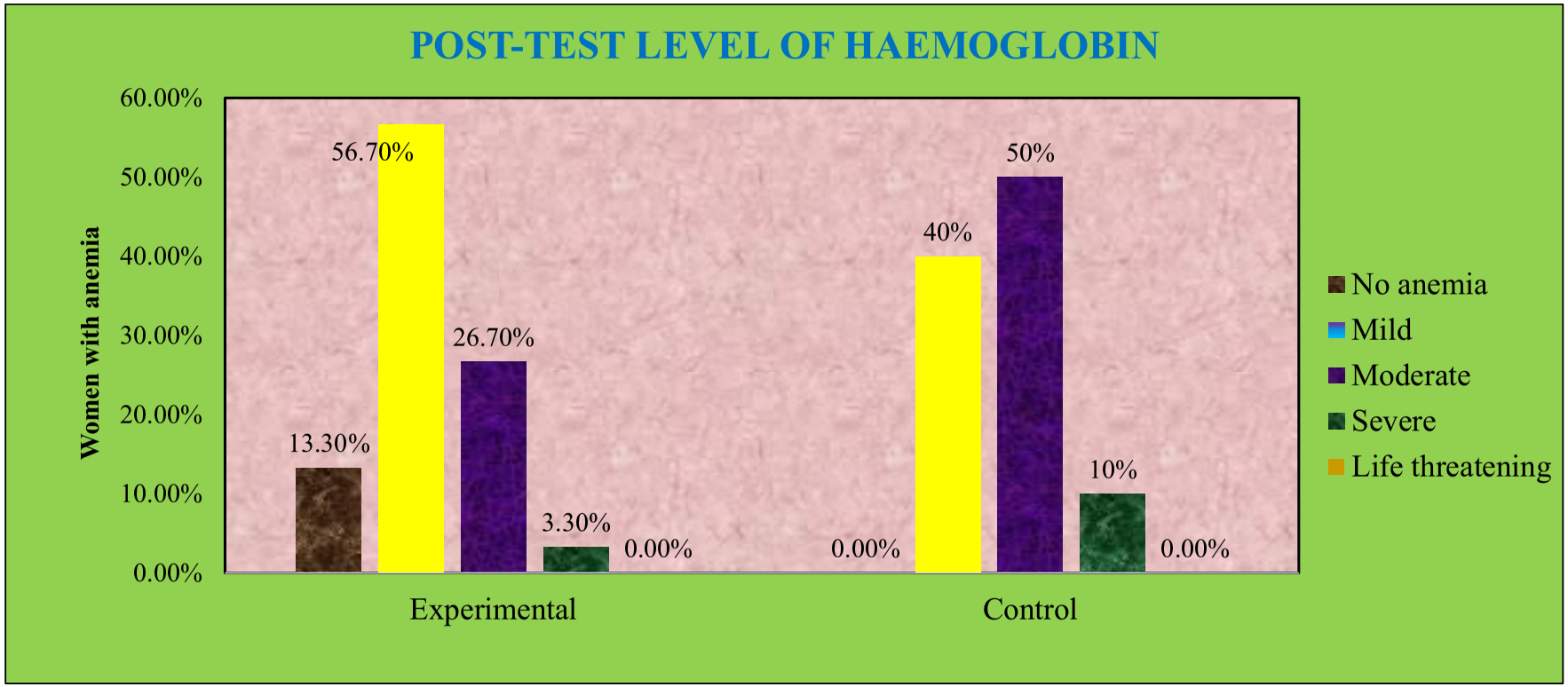



Figure 4.13 : Frequency percentage of post test haemoglobin level

**Section-D: Comparison of group I and group II haemoglobin**

**Table 4.5: Comparison of experimental & control group haemoglobin**

| | No. of women | Experiment | Control | Mean difference | Student's independent t-test |
|---|---|---|---|---|---|
| | | Mean ± SD | Mean ± SD | | |
| Pretest | 30 | 8.30±1.19 | 8.40±1.02 | 0.10 | t=0.38 P=0.72 not significant |
| Post-test | 30 | 9.80±1.12 | 8.94±1.00 | 0.92 | **t=3.143 P=0.003*** significant** |

* Significant at P≤0.05 ** highly significant at P≤0.01

*** Very high significant at P≤0.001

The above table shows that, the haemoglobin level In the pre-test, experiment group the mean haemoglobin was 8.3gm/dl and control group the mean haemoglobin was 8.4gm/dl,so the difference is 0.1,this difference is small and it is not statistically significant difference, t= 0.38 p=0.72. In the post test, experimental group, the mean haemoglobin was 9.8 mg/dl and control group the mean haemoglobin was 8.94gm/dl. So the difference is 0.92, this difference is large and it is a statistically significant difference. Statistical significance was calculated by using student's independent t-test t=3.143 p=0.003***

**Table 4.6: Comparison of pretest & post-test mean haemoglobin**

| | No. of women | PRETEST | POSTTEST | Mean difference | Student's paired t-test |
|---|---|---|---|---|---|
| | | Mean ± SD | Mean ± SD | | |
| Experiment | 30 | 8.30±1.19 | 9.80±1.12 | 1.49 | **t=12.08 P=0.001*** significant** |
| Control | 30 | 8.40±1.02 | 8.94±1.00 | 0.53 | **t=31.71 P=0.06*** Not significant |

* Significant at P≤0.05 ** highly significant at P≤0.01

*** Very high significant at P≤0.001***

The above table shows that, comparison of pre-test ,post-test haemoglobin level on an average in experimental group, the pre-test mean haemoglobin was 8.30gm/dl and the post-test mean haemoglobin was 9.80gm/dl, mean difference is 1.49,t=12.08,p=0.001*** ,so it was statistically highly significant . In the control group the pre-test mean haemoglobin was 8.40gm/dl and the post-test mean haemoglobin was 8.94gm/dl, mean difference is 0.53, t=31.71, p=0.06, so it was not statistically significant. These results shows that, fenugreek leaves with elemental iron was highly significant.

**Table 4.7: Level of anaemia between experimental and control group**

**(N=60)**

| | Level of anaemia | Experimental | | Control | | Chi-square test |
|---|---|---|---|---|---|---|
| | | No. of women | In % | No. of women | In % | |
| Pre test | No anaemia | 0 | 0.0 | 0 | 0.0 | $\chi^2$=0.75 P=0.85 Not Significant |
| | Mild | 3 | 10 | 5 | 16.7 | |
| | Moderate | 15 | 50 | 15 | 50 | |
| | Severe | 9 | 30 | 8 | 26.7 | |
| | Life threatening | 3 | 10 | 2 | 6.7 | |
| | Total | 30 | 100.0 | 30 | 100.0 | |
| Post test | No anaemia | 4 | 13.3 | 0 | 0.0 | $\chi^2$=7.99 P=0.01** Significant |
| | Mild | 17 | 56.7 | 12 | 40 | |
| | Moderate | 8 | 26.7 | 15 | 50 | |
| | Severe | 1 | 3.3 | 3 | 10 | |
| | Life threatening | 0 | 0.0 | 0 | 0.0 | |
| | Total | 30 | 100.0 | 30 | 100.0 | |

* Significant at P≤0.05

** Highly significant at P≤0.01

*** Very high significant at P≤0.001

The above table reveals that, the level of anaemia in the experimental and control group. In pre-test, the level of haemoglobin among women both group I and group II. . In group I, none of the women are not in no anaemia category. 10% (3) of women had mild anaemia, 50% (15) of women had moderate anaemia and 30% (9) of women had severe anaemia, 10% (3) women had life threating anaemia, In group II, none of women are not in no anaemia category,16.7% (5) of women had mild anaemia, 50 % (15) of women had moderate anaemia and 26.7% (8) of them had severe anaemia, 6.7% (2) women had life threating anaemia.

The post-test level of haemoglobin among women both group me and group II. In group I, 13.3% (4) of women are not anaemic, 56.7 %( 17) of women had mild anaemia, 26.7% (8) of women had moderate anaemia and 3.3% (1) of women had severe anaemia and none of the women had life threatening anaemia. In group II, 0.0% (0) of them women had not anaemic, 40.0 %( 12) of women had mild anaemia, 50.0 %( 15) of women had moderate anaemia and 10 %( 3) of women had severe anaemia, none of them women had life threatening anaemia.

**Section E: Effectiveness of fenugreek leaves with elemental iron on anaemia**

**Table 4.8: Effectiveness of Fenugreek leaves**

| Group | Pre-test Mean Hb | Post-test Mean Hb | Mean difference Hb with 95% confidence interval | Percentage difference hb with 95% confidence interval |
|---|---|---|---|---|
| Experimental | 8.30 | 9.8 | 1.49 (1.24– 1.74) | **15.20% (12.65%–17.75%)** |
| Control | 8.40 | 8.94 | 0.53(0.49 – 0.56) | **5.92% (5.48%6.26%)** |

* Significant at P≤0.05

** Highly significant at P≤0.01 *** very high significant at P≤0.001

The above table reveals that, the mean haemoglobin between experimental and control group. In the experimental group, the pre-test mean haemoglobin score was 8.30 gm/dl, the post-test mean haemoglobin score was 9.8gm/dl. The mean difference with 95% confidence interval was 1.49 and the percentage difference from baseline with 95% confidence interval was 15.20%. In the control group, the pre test mean haemoglobin score was 8.40 gm/dl, the post-test mean haemoglobin score was 8.94gm/dl. The mean difference with 95% confidence interval was 0.53, and the percentage difference from baseline with 95% confidence interval was 5.92 %. These differences shows that, the effectiveness of fenugreek leaves with elemental iron is more.

**SECTION- F: To associate the findings with the selected demographic and clinical variables among women in experimental group and control group**

**Table 4.9: Association between demographic variables with increased haemoglobin level (Experimental group) N=(60)**

| Demographic variables | | level of haemoglobin gain | | | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|---|---|
| | | Below <1 | | 1-1.9 | | Above 2 | | | |
| | | F | In% | F | In% | F | In% | | |
| Age | 25-30 yrs | 3 | 10 | 5 | 16.7 | 1 | 3.3 | 9 | **$\chi^2$=3.49 p=0.05*** |
| | 31 -35 yrs | 1 | 3.3 | 4 | 13.3 | 2 | 6.7 | 7 | |
| | 36 -40 yrs | 1 | 3.3 | 4 | 13.3 | 3 | 10 | 8 | |
| | 41 -45 yrs | 1 | 3.3 | 4 | 13.3 | 1 | 3.3 | 6 | |
| Religion | Hindu | 2 | 6.7 | 6 | 20.0 | 5 | 16.7 | 13 | $\chi^2$=5.85 p=0.44 |
| | Christian | 1 | 3.3 | 5 | 16.7 | 2 | 6.7 | 8 | |
| | Muslim | 3 | 10 | 5 | 16.7 | 0 | .0 | 8 | |
| | Others | 0 | 0.0 | 1 | 3.3 | 0 | .0 | 1 | |
| Educational Status | No formal education | 1 | 3.3 | 4 | 13.3 | 0 | .0 | 5 | $\chi^2$=13.64 p=0.09 |
| | Primary | 0 | 0.0 | 4 | 13.3 | 1 | 3.3 | 5 | |
| | High school | 0 | 0.0 | 7 | 23.3 | 3 | 10 | 10 | |
| | HSc | 2 | 6.7 | 1 | 3.3 | 2 | 6.7 | 5 | |
| | Graduate | 3 | 10 | 1 | 3.3 | 1 | 3.3 | 5 | |
| Occupation | Home maker | 1 | 3.3 | 8 | 26.7 | 4 | 13.3 | 13 | $\chi^2$=9.31 p=0.15 |
| | Govt employee | 3 | 10 | 1 | 3.3 | 1 | 3.3 | 5 | |
| | Private employee | 0 | .0 | 5 | 16.7 | 1 | 3.3 | 5 | |
| | Self-employee | 2 | 6.7 | 3 | 10 | 1 | 3.3 | 6 | |
| Marital status | Married | 1 | 3.3 | 12 | 40.0 | 3 | 10 | 16 | $\chi^2$=11.13 p=0.08 |
| | Unmarried | 3 | 10 | 1 | 3.3 | 1 | 3.3 | 5 | |
| | Divorced | 2 | 6.7 | 2 | 6.7 | 1 | 3.3 | 5 | |
| | Widower | 0 | .0 | 2 | 6.7 | 2 | 6.7 | 4 | |
| Family income in (Rs) | < Rs.4726 | 0 | .0 | 3 | 10 | 1 | 3.3 | 8 | **$\chi^2$=9.95 p=0.01*** |
| | Rs.4727-7877 | 1 | 3.3 | 5 | 16.7 | 0 | .0 | 6 | |
| | Rs.7878-11816 | 2 | 6.7 | 2 | 6.7 | 3 | 10 | 7 | |
| | >Rs.11817 | 3 | 10 | 7 | 23.3 | 3 | 10 | 9 | |
| Dietary habits | Vegetarian | 2 | 6.7 | 8 | 26.7 | 4 | 13.3 | 14 | $\chi^2$=0.73 p=0.69 |
| | NonVegetarian | 4 | 13.3 | 9 | 30.0 | 3 | 10 | 16 | |
| Food rich in iron | Drum stick | 0 | .0 | 7 | 23.3 | 2 | 6.7 | 9 | $\chi^2$=8.60 p=0.19 |
| | Dates | 2 | 6.7 | 5 | 16.7 | 2 | 6.7 | 9 | |
| | Fenugreek leaves | 4 | 13.3 | 2 | 6.7 | 2 | 6.7 | 8 | |
| | Jaggery | 0 | .0 | 3 | 10 | 1 | 3.3 | 4 | |
| History of deworming | Yes | 3 | 10 | 7 | 23.3 | 2 | 6.7 | 12 | $\chi^2$=0.64 p=0.72 |
| | No | 3 | 10 | 10 | 33.3 | 5 | 16.7 | 18 | |
| If yes means when | <3 month | 2 | 6.7 | 5 | 16.7 | 1 | 3.3 | 8 | $\chi^2$=2.25 p=0.69 |
| | <6 month | 2 | 6.7 | 3 | 10 | 3 | 10 | 8 | |
| | More than 6 month | 2 | 6.7 | 9 | 30.0 | 3 | 10 | 14 | |

* Significant at P≤0.05, ** highly significant at P≤0.01

*** Very high significant at P≤0.001

The above table shows that those in age ($\chi 2$=3.49p=0.05), more income ($\chi 2$=9.95p=0.01), of women gained more haemoglobin. Statistical significance was calculated using chi square test. This study analysis revealed that there was a significant effect of fenugreek leaves with elemental iron is improving blood haemoglobin level among women.

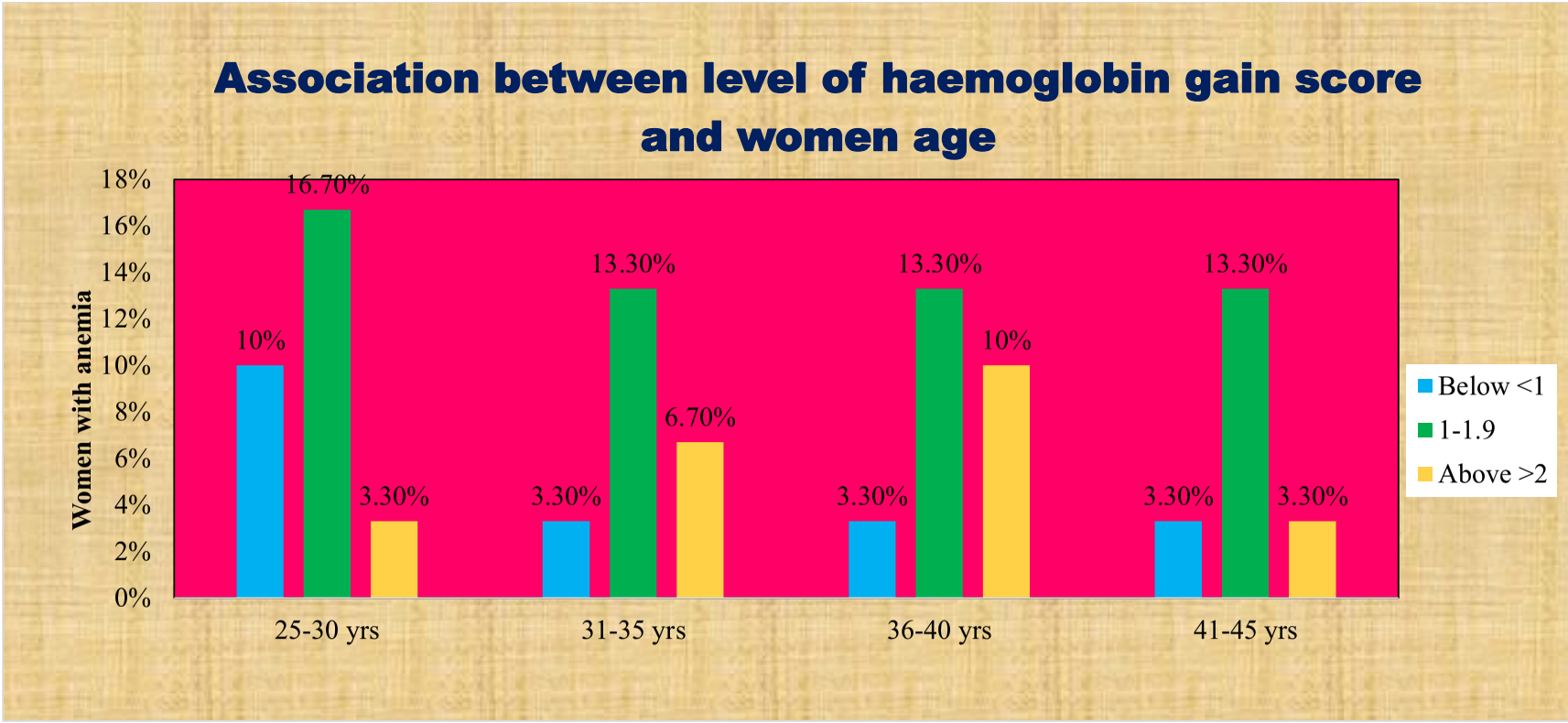



Figure 4.14 : Association between increased haemoglobin level and women age

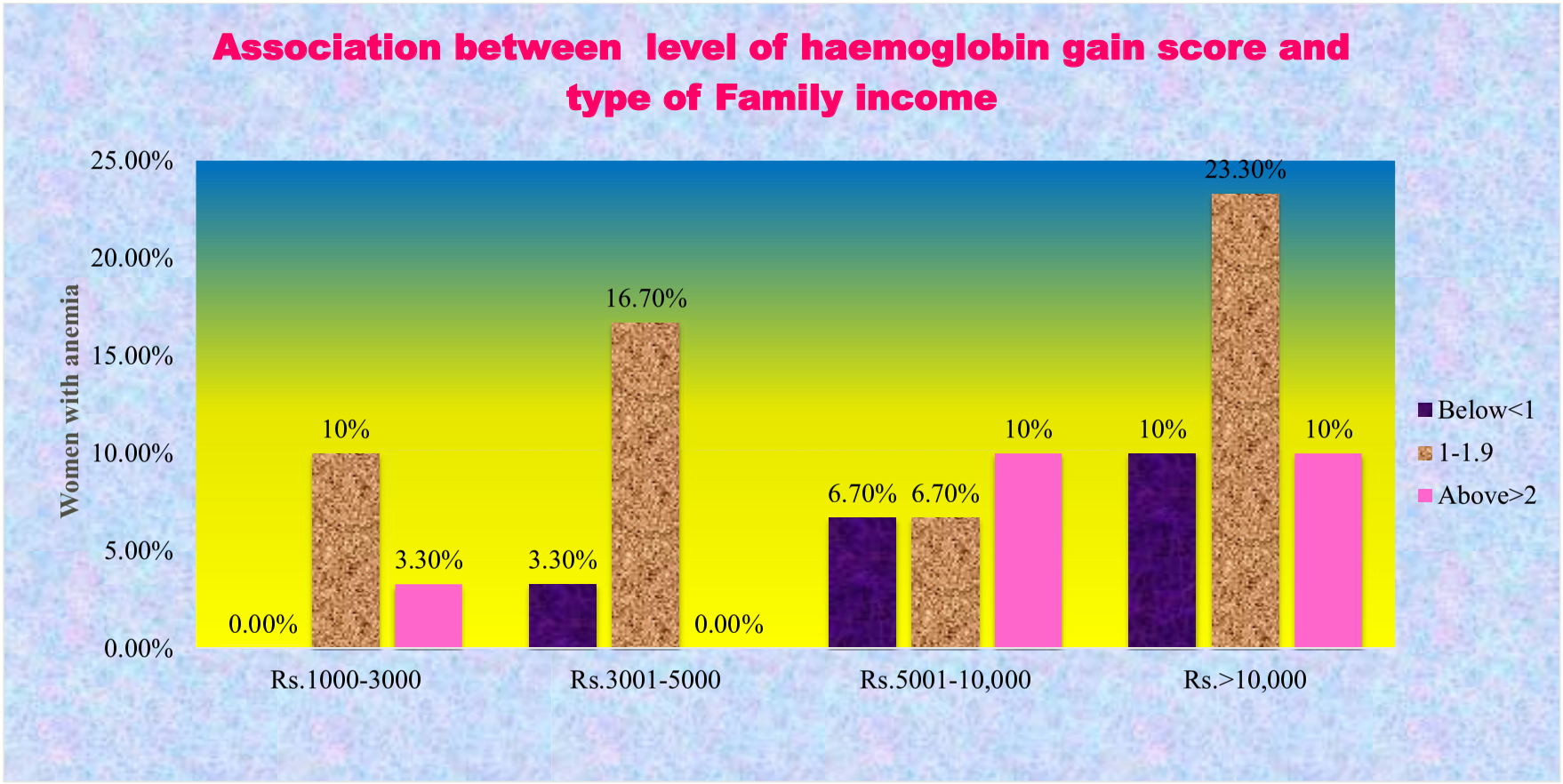



Figure 4.15 : Association between increased haemoglobin level and family income

**Table 4.10: Association between clinical variables with increased haemoglobin level (Experimental group)**

| Demographic variables | | level of haemoglobin gain | | | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|---|---|
| | | Below <1 | | 1-1.9 | | Above 2 | | | |
| | | F | In% | F | In% | F | In% | | |
| Age at menarche | 10 -12 yrs | 3 | 10 | 5 | 16.7 | 0 | .0 | 8 | $\chi2$=8.30 p=0.08 |
| | 13 -15 yrs | 3 | 10 | 9 | 30.0 | 3 | 10 | 15 | |
| | 16 -18 yrs | 0 | .0 | 3 | 10 | 4 | 13.3 | 7 | |
| Menstrual history | Regular | 2 | 6.7 | 10 | 33.3 | 5 | 16.7 | 17 | **$\chi2$=1.98 p=0.05*** |
| | Irregular | 4 | 13.3 | 7 | 23.3 | 2 | 6.7 | 13 | |
| Flow of menstruation | <5 days | 2 | 6.7 | 11 | 36.6 | 6 | 20.0 | 19 | **$\chi2$=3.84** |
| | > 5 days | 4 | 13.3 | 6 | 20.0 | 1 | 3.3 | 11 | **p=0.03*** |
| Frequency of menstrual flow | >28 days | 2 | 6.7 | 6 | 20.0 | 4 | 13.3 | 12 | $\chi2$=4.3 p=0.36 |
| | 28 days | 1 | 3.3 | 9 | 30.0 | 2 | 6.7 | 13 | |
| | <28 days | 3 | 10 | 2 | 6.7 | 1 | 3.3 | 5 | |
| Pads used/day | 2-4 pads/day | 2 | 6.7 | 6 | 20.0 | 4 | 13.3 | 12 | $\chi2$=2.79 p=0.59 |
| | 5-8 pads/day | 2 | 6.7 | 9 | 30.0 | 2 | 6.7 | 13 | |
| | 9-12 pads/day | 2 | 6.7 | 2 | 6.7 | 1 | 3.3 | 5 | |
| Number of gravida | No | 3 | 10 | 5 | 16.7 | 3 | 10 | 11 | **$\chi2$=11.86 p=0.01*** |
| | One | 1 | 3.3 | 4 | 13.3 | 1 | 3.3 | 6 | |
| | Two | 2 | 6.7 | 4 | 13.3 | 0 | .0 | 6 | |
| | Three | 0 | .0 | 2 | 6.7 | 2 | 6.7 | 4 | |
| | More than three | 0 | .0 | 1 | 3.3 | 1 | 3.3 | 8 | |
| Medical problems | No | 4 | 13.3 | 10 | 43.3 | 5 | 16.7 | 19 | $\chi2$=2.28 p=0.88 |
| | Diabetes mellitus | 0 | .0 | 3 | 10 | 1 | 3.3 | 4 | |
| | Cardiac problems | 1 | 3.3 | 2 | 6.7 | 1 | 3.3 | 4 | |
| | Others specify | 1 | 3.3 | 2 | 6.7 | 0 | .0 | 3 | |

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Clinical variables are menstrual history regular ($\chi2$=1.98 p=0.03), Flow of menstruation ($\chi2$=3.84 p=0.03*) number of gravida ($\chi2$=11.86, p=0.01) of women gained more haemoglobin. Statistical significance was calculated using chi square test. This study analysis revealed that there was a significant effect of fenugreek leaves with elemental iron on improving blood haemoglobin level among women

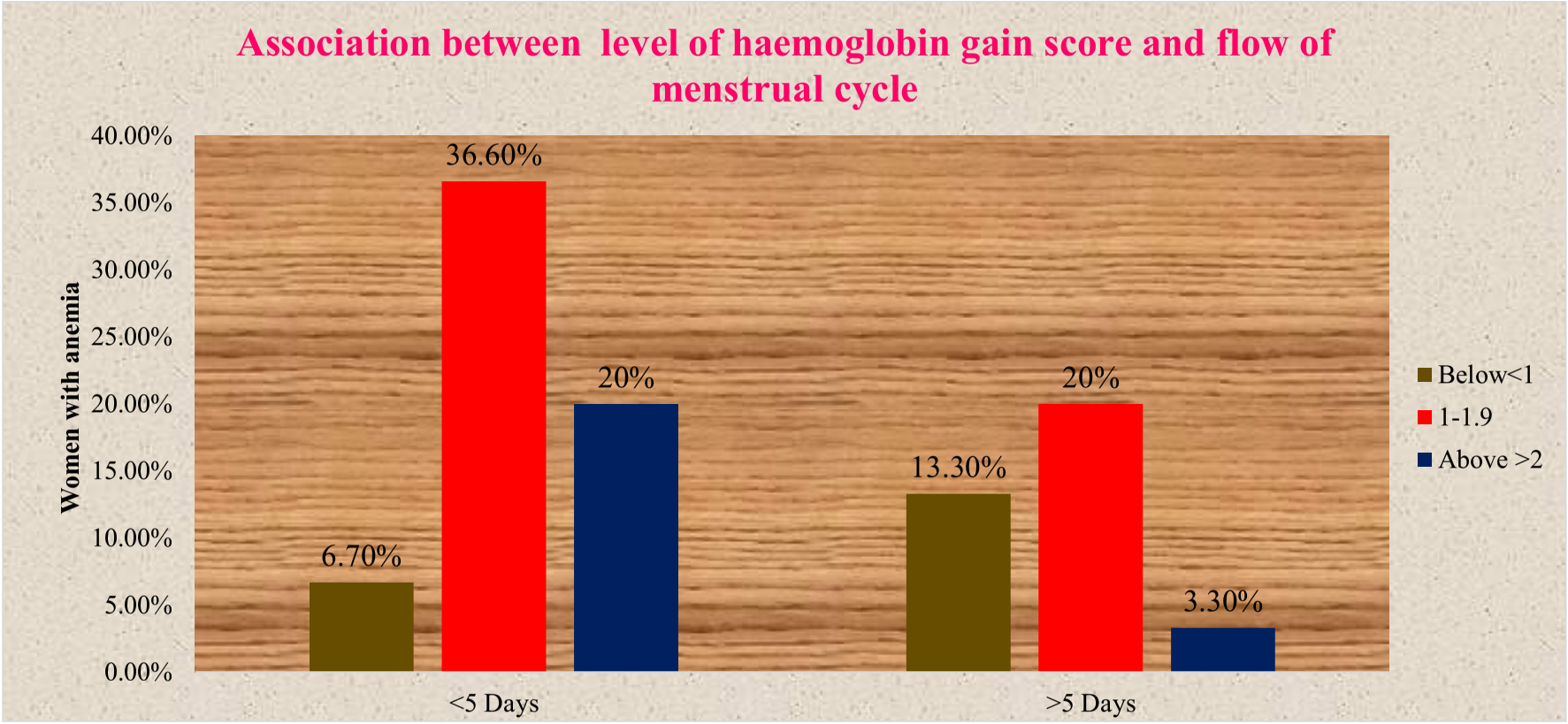



Figure 4.16 : Association between increased haemoglobin level and flow of menstruation.

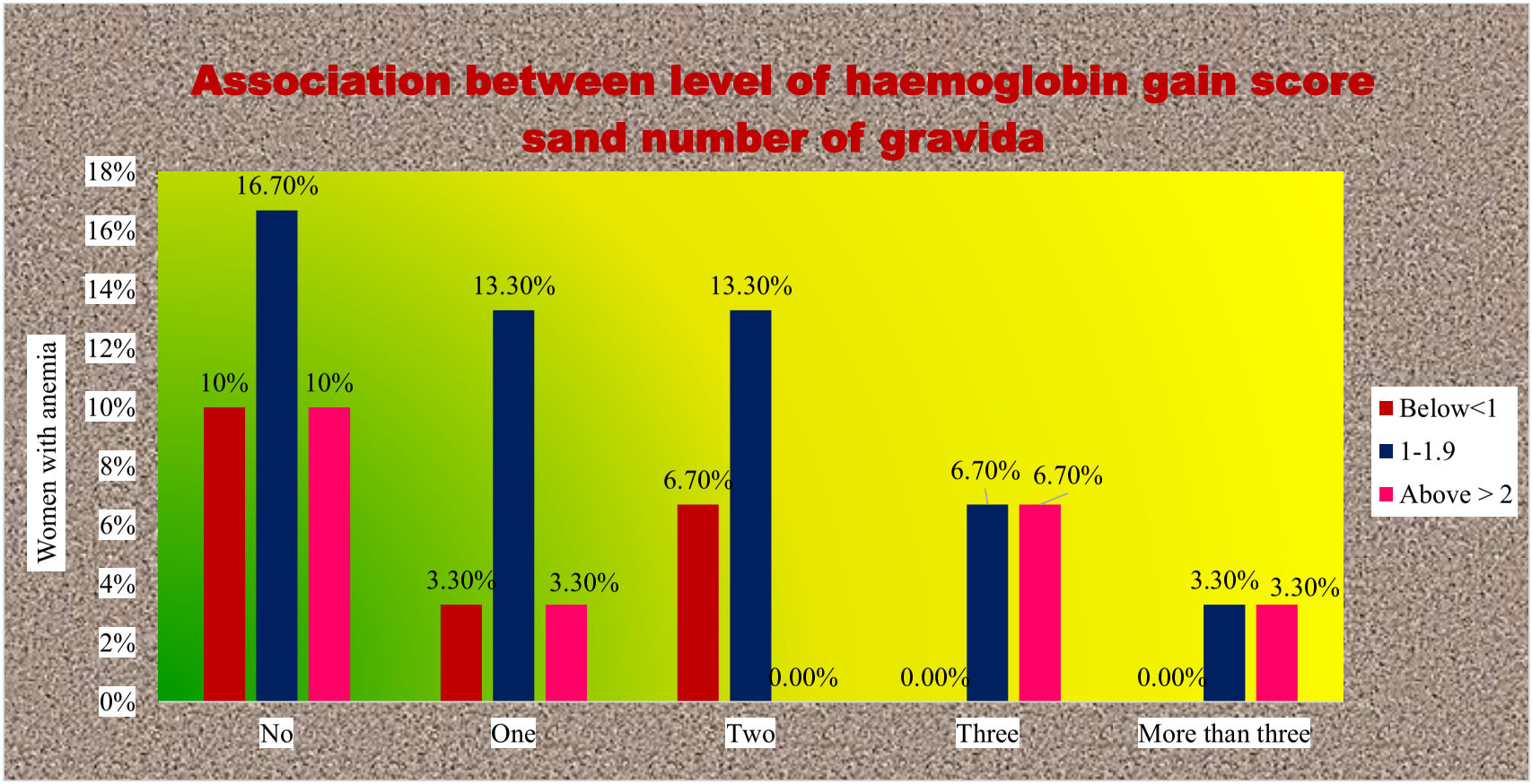



Figure 4.17 : Association between increased haemoglobin level and number of gravida.

**Table: 4.11 Association between demographic variables with increased haemoglobin level (Control group) N= (60)**

| Demographic Variables | | level of haemoglobin gain | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|
| | | Increased up to (0.53) | | Increased Above average (>0.53) | | | |
| | | F | In % | F | In % | | |
| Age | 25 -30 yrs | 7 | 23.3 | 5 | 16.7 | 12 | $\chi2=3.72$ p=0.29 |
| | 31 -35 yrs | 6 | 20 | 1 | 3.3 | 7 | |
| | 36 -40 yrs | 2 | 6.7 | 4 | 13.3 | 6 | |
| | 41-45 yrs | 3 | 10 | 2 | 6.7 | 5 | |
| Religion | Hindu | 9 | 30 | 5 | 16.7 | 14 | $\chi2=1.48$ p=0.68 |
| | Christian | 5 | 16.7 | 2 | 6.7 | 7 | |
| | Muslim | 2 | 6.7 | 3 | 10 | 5 | |
| | Others | 2 | 6.7 | 2 | 6.7 | 4 | |
| Educational status | No formal education | 3 | 10 | 3 | 10 | 6 | $\chi2=3.61$ p=0.46 |
| | Primary | 4 | 13.3 | 4 | 13.3 | 8 | |
| | High school | 4 | 13.3 | 2 | 6.7 | 6 | |
| | HSc | 3 | 10 | 3 | 10 | 6 | |
| | Graduate | 4 | 13.3 | 0 | 0.0 | 4 | |
| Occupation | Home maker | 6 | 20 | 4 | 13.3 | 10 | $\chi2=4.37$ p=0.22 |
| | Govt employee | 4 | 13.3 | 0 | 0.0 | 4 | |
| | Private employee | 5 | 16.7 | 3 | 10 | 8 | |
| | Self-employee | 3 | 10 | 5 | 16.7 | 8 | |
| Marital status | Married | 5 | 16.7 | 5 | 16.7 | 10 | $\chi2=4.04$ p=0.25 |
| | Unmarried | 10 | 33.3 | 2 | 6.7 | 12 | |
| | Divorced | 1 | 3.3 | 4 | 13.3 | 5 | |
| | Widower | 2 | 6.7 | 1 | 3.3 | 3 | |
| Family income in (Rs) | < Rs.4726 | 7 | 23.3 | 3 | 10 | 10 | $\chi2=0.77$ p=0.85 |
| | Rs.4727-7877 | 3 | 10 | 2 | 6.7 | 5 | |
| | Rs.7878-11816 | 4 | 13.3 | 4 | 13.3 | 8 | |
| | >Rs.11817 | 4 | 13.3 | 3 | 10 | 7 | |
| Dietary habits | Vegetarian | 7 | 23.3 | 7 | 23.3 | 14 | $\chi2=1.09$ p=0.29 |
| | Non- Vegetarian | 5 | 16.7 | 11 | 36.6 | 16 | |
| Food rich in iron | Drum stick | 4 | 13.3 | 5 | 16.7 | 9 | $\chi2=8.93$ p=0.03 |
| | Dates | 0 | 0.0 | 9 | 30 | 9 | |
| | Fenugreek leaves | 3 | 10 | 3 | 10 | 6 | |
| | Jaggery | 2 | 6.7 | 4 | 13.3 | 6 | |
| History of deworming | Yes | 8 | 26.7 | 6 | 20 | 14 | $\chi2=0.08$ p=0.76 |
| | No | 10 | 33.3 | 6 | 20 | 16 | |
| If yes, means when | <3 month | 3 | 10 | 3 | 10 | 6 | $\chi2=0.48$ p=0.78 |
| | <6 month | 8 | 26.7 | 4 | 13.3 | 12 | |
| | More than six month | 7 | 23.3 | 5 | 16.7 | 12 | |

None of the demographic variables associated with haemoglobin gain in control group. Statistical significance was calculated using chi square test.

**Table: 12 Association between clinical variables with increased haemoglobin level (Control group) N= (60)**

| Demographic Variables | | Level of haemoglobin gain | | | | Total | Chi square test |
|---|---|---|---|---|---|---|---|
| | | Increased up to (0.53) | | Increased Above average (>0.53) | | | |
| | | F | In % | F | In % | | |
| Age at menarche | 10 -12 yrs | 3 | 10 | 6 | 20 | 9 | $\chi 2$=4.01 p=0.13 |
| | 13 -15 yrs | 11 | 36.6 | 5 | 16.7 | 16 | |
| | 16 -18 yrs | 4 | 13.3 | 1 | 3.3 | 5 | |
| Menstrual history | Regular | 11 | 36.6 | 8 | 26.7 | 19 | $\chi 2$=0.09 p=0.75 |
| | Irregular | 7 | 23.3 | 4 | 13.3 | 11 | |
| Flow of menstruation | < 5 days | 9 | 30 | 9 | 30 | 18 | $\chi 2$=1.87 p=0.17 |
| | > 5 days | 9 | 30 | 3 | 10 | 12 | |
| Frequency of menstrual flow | <28 days | 7 | 23.3 | 1 | 3.3 | 8 | $\chi 2$=3.65 p=0.16 |
| | 28 days | 8 | 26.7 | 7 | 23.3 | 15 | |
| | >28 days | 3 | 10 | 4 | 13.3 | 7 | |
| Pads used/day | 2-4 pads/day | 6 | 20 | 7 | 23.3 | `13 | $\chi 2$=1.89 p=0.38 |
| | 5-8 pads/day | 8 | 26.7 | 3 | 10 | 11 | |
| | 9-12 pads/day | 4 | 13.3 | 2 | 6.7 | 6 | |
| Number of gravida | No | 5 | 16.7 | 2 | 6.7 | 7 | $\chi 2$=5.99 p=0.20 |
| | One | 6 | 20 | 1 | 3.3 | 7 | |
| | Two | 5 | 16.7 | 1 | 3.3 | 6 | |
| | Three | 4 | 13.3 | 2 | 6.7 | 6 | |
| | More than three | 2 | 6.7 | 2 | 6.7 | 4 | |
| Medical problems | No | 11 | 36.6 | 7 | 23.3 | 18 | $\chi 2$=3.14 p=0.36 |
| | Diabetes mellitus | 3 | 10 | 3 | 10 | 6 | |
| | Cardiac problems | 1 | 3.3 | 2 | 6.7 | 3 | |
| | Others specify | 3 | 10 | 0 | 0.0 | 3 | |

* Significant at P≤0.05 ** highly significant at P≤0.01

*** Very high significant at P≤0.001

None of the clinical variables associated with haemoglobin gain in control group. Statistical significance was calculated using chi square test.

# CHAPTER - V

# SUMMARY OF RESULTS

# CHAPTER –V

## SUMMARY OF RESULTS

According to the world health organization, iron deficiency is the one of the nutritional disorder in the world. They can be largely by taking iron rich foods and taking elemental iron and simple precautions and proper control of the disease which would certainly make it possible to lead a normal, active and healthy life. The assumption of the study was fenugreek leaves with elemental iron is effect on improvement in the level of haemoglobin among women.

**Major findings of the study:**

Frequency and percentage distribution of demographic and clinical variables of anaemia among women in experimental and control group are as follows:

**Demographic variables**

Women who are participated in this study, majority of them were belongs to the **age group** of 25-30 years, 30 %( 9) in group I 40 %( 12) in group II.

According to the **religion**, majority of them were Hindu 43% (13) in group I, 46 %( 14) in group II.

Based on the **educational status**, majority of them were studied high school 33.3 %( 10) in group I, 26.7 %( 8) in group II.

Based on the **occupational status** majority of them are belongs to homemaker 60.0% (18) in group I, 53.3 %( 16) in group II.

Based on the **marital status** majority of them are married 53.3% (16) in group I, 50 %( 15) in group II,

Regarding **family income,** majority of them were belongs to earn more than Rs.11817 40 %( 12) in group I, 33.3 %( 10) in group II.

Based on **dietary habit majority** of them are take non-vegetarian diet 60.0 %( 18) in group I, 56.7 %( 17) in group II.

Based on the **food rich in iron**, majority of them are saying dates 36.7 %( 11) in group I, 33.3 %( 10) in group II.

According to the **history of deworming**, majority of them was taking Albendazole 400 mg more than 6 month 46.7% (14) in group I,40 %(12) in group II

**Clinical variables**

Based on the clinical variables **age at menarche** 13-15 years, 50.0 %( 15) in group I, 53.3 %( 16) in group I.

Majority of the women **menstrual history** is regular were 56.7 %( 17) in group I, 63.3 %( 19) in group II.

Based on the **flow of menstruation** majority of them are<5days, 63.3 % (19) in group I, 60.0 %( 18) in group II.

Based on the **frequency of menstrual flow** within 28 days 43.4 % (13) in group I, 50.0 % ( 15) in group II.

Based on the **pads used/day** majority of them were used 2-4 pads/day 46.7% (14) in group I, 43.4 % (13) in group II.

Based on the **number of gravida** majority of them are more than 3 gravida 26.7 % (8) in group I, 30 % (9) in group II.

Based on the **medical problems** majority of them are not having diseases 63.3 %( 19) in group I, 60.0 %( 18) in group II.

In pre-test, the level of haemoglobin among women both group I and group II. . In group I, none of the women are not in no anaemia category. 10% (3) of women had mild anaemia, 50% (15) of women had moderate anaemia and

30% (9) of women had severe anaemia, 10% (3) women had life threating anaemia, In group II, none of women had not in no anaemia category,16.7% (5) of women had mild anaemia, 50 % (15) of women had moderate anaemia and 26.7% (8) of them had severe anaemia, 6.7% (2) women had life threating anaemia.

The post-test level of haemoglobin among women both group I and group II. In group I, 13.3% (4) of women are not in no anaemia category, 56.7 %( 17) of women had mild anaemia, 26.7% (8) of women had moderate anaemia and 3.3% (1) of women had severe anaemia and none of the women had life threatening anaemia. In group II, 0.0% (0) of them women are not in no anaemia category, 40.0 %( 12) of women had mild anaemia, 50.0 %( 15) of women had moderate anaemia and 10 %( 3) of women had severe anaemia, none of them women had life threatening anaemia.

Comparison of group I and group II haemoglobin level, In pre-test experimental group, the mean haemoglobin level was 8.3gm/dl and the control group the mean haemoglobin level was 8.4gm/dl, so the difference is 0.10,this difference is small and it is not statistically significant difference, t=0.38 p=0.72. In post-test, experimental group the mean haemoglobin was 9.8gm/dl and control group the mean haemoglobin was 8.94gm/dl level of haemoglobin, so the difference is 0.92, t=3.143 and the p value is p=0.003*** this difference is large and it is statistically very high significant difference. Statistical significance was calculated using student's independent t test.

Comparison of pre-test and post-test haemoglobin in group I and group II.Pre-test, post-test haemoglobin level on an average, in experimental group the pre-test mean haemoglobin was 8.30gm/dl and the post-test mean haemoglobin was 9.8gm/dl ,t=12.08,p=0.001***,so it was statistically highly significant. In the control group, the pre-test mean haemoglobin was 8.40gm/dl and the post-test mean haemoglobin was 8.94gm/dl, t=31.71p=0.06 so it was not statistically

significant. These results shows that, fenugreek leaves with elemental iron was highly significant.

The effectiveness of fenugreek leaves with elemental iron in the experimental group, the pre-test mean haemoglobin score was 8.30 gm/dl, the post-test mean haemoglobin score was 9.8gm/dl. The mean difference with 95% confidence interval was 1.49 and the percentage difference from baseline with 95% confidence interval was 15.20%. In the control group, the pre-test mean haemoglobin score was 8.40 gm/dl, the post-test mean haemoglobin score was 8.94gm/dl. The mean difference with 95% confidence interval was 0.53, and the percentage difference from baseline with 95% confidence interval was 5.92 %. These differences shows that, the effectiveness of fenugreek leaves with elemental iron is more.

Associate the findings with selected demographic and clinical variables that those in age (x2=3.49, p=0.05*), more income(x2=9.95, p=0.01*), menstrual history regular (x2=1.98, p=0.05*), Flow of menstruation histroy ($\chi$2=3.84, p=0.03*) women having no conception (x2=11.86, p=0.01*), of women gained more haemoglobin. Statistical significance was calculated using chi square test. This study analysis revealed that there was a significant effect of fenugreek leaves with elemental iron on improving blood haemoglobin level among women.

The overall findings of the study showed that fenugreek leaves powder juice along with elemental iron was effective iron will absorbed easily in acidic environment and also it is tasty to drink thereby improving the level of haemoglobin on anaemia among women in experimental group. Thus as a community health nurse the researcher has educated the women about the benefits of fenugreek leaves juice with elemental iron.

# CHAPTER – VI

# DISCUSSION

# CHAPTER –VI

# DISCUSSION

Anaemia is one of the most wide spread public health problems, especially in developing countries like India has important health and welfare, social and economic consequences. These include impaired cognitive development, reduced physical work and in severe cases, an increased risk of mortality particularly during the perinatal period. There is also evidence that anaemia may result in reduced growth and increased morbidity. Given the magnitude of the problem, greater efforts are needed to develop and implement programs, both to prevent and to control anaemia. Research has shown that fenugreek leaves with elemental iron will enhance iron absorption thereby haemoglobin level increased the overall health also improved. To minimize the anaemia complications and to improve the quality of life of anaemia clients this experimental study was done. The purpose of the study to evaluate the effectiveness of fenugreek leaves with elemental iron in improving of blood haemoglobin level among women with anaemia.

**Frequency and percentage distribution of demographic variables of anaemia among women in experimental and control group.**

**Age**

Most of the women in experimental group 30%(9) were in the age group of 25-30 years, 23.3%(7) were in the age group of 31-35 years,26.7%(8) were in the age group of 36-40 years , 20%(6) were in the age group of 41-45 years, and in the control group 40%(12) were in the age group of 25-30 years, 23.3%(7) were in the age group of 31-35 years,20%(6) were in the age group of 36-40 years , 16.7%(5) were in the age group of 41-45 years.

**Religion**

On the basis of religion majority of the women 43.3%(13) were Hindus, 26.7%(8) were Christian 26.7%(8) were Muslims, 3.3%(1) were other religion in the experimental group and in the control group 46.7%(14) were Hindus, 23.3%(7) were Christian 16.7%(5) were Muslims, 13.3%(4) were other religion.

**Education**

On considering the educational status of the women 16.7%(5) women had no formal education 16.7%(5) women had primary education, 3.3%(10) women had high school education,16.7%(5) women had higher secondary education, 16.7%(5) women are graduate, in the experimental group and in the control group 20.0%(6) women had no formal education,23.3%(7) women had primary education, 26.7%(8) women had high school education,16.7%(5) women had higher secondary,13.3%(4) women are graduate,

**Occupation**

On the basis of occupation majority of the women 43.3%(13) were homemaker, 16.7%(5) were government employee,20.0%(6)were private employee ,20.0%(6)were self-employee in the experimental group and in the control group were 33.3%(10) were homemaker, 13.3%(4) were government employee,26.7%(8) were private employee ,26.7%(8) were self-employee.

**Marital status**

Based on marital status majority of the women 53.3% (16) women are married, 16.7%(5) women are unmarried, 16.7%(5) women are divorced, 13.3%(4) women are widower in the experimental group and in control group 50% (15) women are married, 23.3%(7) women are unmarried, 16.7%(5) were divorced, 10%(3) women are widower.

**Family income**

In case of family income 16.7% (5) were earn between,< Rs.4726, 20.0% (6) were earn between Rs.4727-7877,23.3% (7) were between Rs.7878-11816, 40% (12) were earn more than Rs.11817 in the experimental group and in control group 23.3% (7) were earn between < Rs.4726,16.7%(5) were earn between Rs.4727-7877, 26.7%(8) were between Rs.7878-11816, 33.3%(10) were earn more than Rs. 11817.

**Dietary habits**

Based on dietary habits majority of the women follows non vegetarian 60.0%(18),and 40%(12) were vegetarian in the experimental group and 43.3%(13) were follows vegetarian ,56.7%(17) were non vegetarian in the control group.

**Food rich in iron**

Regarding knowledge about food rich in iron 26.7%(8) were said drum stick,36.7%(11) were said dates,26.7%(8) were said fenugreek leaves, 10%(3) were said jaggery in experimental group and in control group 23.3%(7) were said drum stick, 10%(3) were said dates, 23.3%(7) were said fenugreek leaves, 20.0%(6) were said jaggery.

**Deworm history**

In experimental group 40.0% (12) were dewormed previously,60.0% (18) were not dewormed previously and in the control group 53.3% (16) were dewormed previously,46.7%(14)were not dewormed previously .

**Deworm duration history**

In experimental group 26.7%(8) were dewormed <3month, 26.7%(8) were dewormed<6 month ,46.7%(14) were dewormed more than 6 month and in the

control group group 23.3%(7) were dewormed <3month,) 36.7% (11) were dewormed<6 month,40%(12) were dewormed more than 6 month.

**Menarche age**

Regarding women are attained menarche 26.7%(8) were in the age group 10-12 years, 50.0%(15) were in the age group of 13-15 years, 23.3%(7) were in the age group of 16-18 years in the experimental group and in control group 30%(9) in the age group of 10-12 years, 53.3%(16) were in the age group of 13-15 years, 16.7%(5) were in the age group of 16-18 years.

**Menstrual history**

Regarding menstrual history 56.7% (17) were getting regular menses, 43.3% (13) were getting irregular menses in the experimental group and in the control group 63.3% (19) were getting regular menses, 36.7%(11) were getting irregular menses.

**Flow of menstruation**

Regarding Flow of menstrual cycle 63.3% (19) women had menses flow <5 days, 36.7% (11) women had menses flow >5 days, in the experimental group and in the control group 60% (18) women had menses flow <5 days, 40%(12) women had menses flow >5 days.

**Frequency of menstrual flow**

Frequency of menstrual flow 33.3%(10) were getting less than 28 days, 43.3%(13) were getting within 28 days, 23.3%(7) were getting more than 28 days in the experimental group and in the control group 26.7%(8) were getting less than 28 days, 50.0%(15) were getting within 28 days, 23.3%(7) were getting more than 28 days.

**Pads used/day**

Regarding pads used/day 46.7%(14) were used between 2-4 pads/day,36.7%(11) were used between used 5-8 pads/day, 16.7%(5)were used between 9-12 pads/day in the experimental group and in control group 43.3%(13) were used between 2-4 pads/day,36.7%(11) were used between 5-8 pads/day, 20.0%(6) were used between 9-12 pads/day.

**Number of gravida histroy**

Based on the number of gravida histroy in experimental group 23.3%(7) women are no gravida histroy, 20.0%(6) women are one gravida histroy, 16.7%(5) women are two gravida histroy, 13.3%(4) women had three gravida histroy, 26.7%(8) women are more than three gravida histroy and in control group 23.3%(7) women are no gravida histroy, 10%(3) women were one gravida histroy, 20.0%(6) women are two gravida histroy, 16.7%(5) women are three gravida histroy, 30%(9) women are more than three gravida histroy.

**Medical problems**

Regarding women had medical problems in experimental group 63.3%(19) women had no medical problems 13.3%(4) women had diabetes mellitus, 13.3%(4) women had cardiac problems, 10%(3) women had other problems and in the control group 60%(18) women had no medical problems, 20.0%(6) women had diabetes mellitus, 10%(3) women had cardiac problems, 10%(3) women had other problems.

The above result was co-inside with the following study **Rakesh Kumar Singh., et.al (2009)** conducted research investigates the prevalence and determinants of anaemia among women in EAG states. The researcher has examined the effects of lifestyle variables on the anaemia level of women of age group 15-49 years. About 40% had mild, 13% had moderate and 14% had severe anaemia. Those women who belong to the 15-49 year age group no and low

education, poorest quintile and 3+children are significantly more likely to be anaemic. Those women who are under weight, have been working in the past years, smoke and chew tobacco have no exposure to mass media and never eating pulses and fruits are found to be more anaemic.

**Objectives of the study are:**

**Objective –I**

**To assess the pre-test haemoglobin level among women in the experimental and control group.**

In pre-test, the level of haemoglobin among women both group I and group II. . In group I, none of the women are not in no anaemia category. 10% (3) of women had mild anaemia, 50% (15) of women had moderate anaemia and 30% (9) of women had severe anaemia, 10% (3) women had life threating anaemia, In group II, none of women had not in no anaemia category,16.7% (5) of women had mild anaemia, 50 % (15) of women had moderate anaemia and 26.7% (8) of them had severe anaemia, 6.7% (2) women had life threating anaemia.

The above objective was supported by the following study **Rajarathnam Jolly et al. (2000)** conducted study on prevalence of anaemia they concluded that the prevalence of anaemia was 43.2% with severe anaemia being 2.1%moderate anaemia and 6.3% mild anaemia.

**Objective -II**

**To assess the post-test haemoglobin level among women in the experimental and control group.**

The post-test level of haemoglobin among women both group I and group II. In group I, 13.3% (4) of women are not in no anaemia category, 56.7 %( 17) of

women had mild anaemia, 26.7% (8) of women had moderate anaemia and 3.3% (1) of women had severe anaemia and none of the women had life threatening anaemia. In group II, 0.0% (0) of them women are not in no anaemia category, 40.0 %( 12) of women had mild anaemia, 50.0 %( 15) of women had moderate anaemia and 10 %( 3) of women had severe anaemia, none of them women had life threatening anaemia.

**Objective-III**

**To compare the pre-test and post-test haemoglobin level among women in the experimental and control group.**

**I.Comparison of group I and group II haemoglobin level:**

In pre-test experimental group, the mean haemoglobin level was 8.30gm/dl and the control group the mean haemoglobin level was 8.40gm/dl, so the difference is 0.10,this difference is small and it is not statistically significant difference, t=0.38 p=0.72. In post-test, experimental group the mean haemoglobin was 9.8gm/dl and control group the mean haemoglobin was 8.94gm/dl level of haemoglobin, so the difference is 0.92, t=3.143 and the p value is p=0.003*** this difference is large and it is statistically very high significant difference. Statistical significance was calculated using student's independent t test.

**Ii.Comparison of pre-test and post-test haemoglobin in group I and group II:**

Comparison of pre-test, post-test haemoglobin level on an average, in experimental group the pre-test mean haemoglobin was 8.30gm/dl and the post-test mean haemoglobin was 9.8gm/dl ,t=12.08,p=0.001**,so it was statistically highly significant. In the control group, the pre-test mean haemoglobin was 8.40gm/dl and the post-test mean haemoglobin was 8.94gm/dl, t=31.71p=0.06

so it was not statistically significant. These results shows that, fenugreek leaves with elemental iron was highly significant.

The above objective was supported by, **Rohini Karambelkar (2012)** measure iron absorption in women n=25 from meals containing fenugreek leaves juice. On two successive days, children consumed identical meals which included mint juice one day and fenugreek leaves juice on the other, in random order. Iron absorption was measured from red blood cell incorporation of the iron stable isotopes 14 days later. Results shows median iron absorption from the meal ingested with mint juice was 7.2%, median iron absorption from the meal ingested with fenugreek leaves juice with elemental iron was 7.8%. They conclude fenugreek leaves juice with elemental iron is effective than mint.

**Objective IV**

**To assess the effectiveness of fenugreek leaves with elemental iron on anaemia among women in experimental group.**

To see the effectiveness of fenugreek leaves with elemental iron in experimental group, the mean haemoglobin level of pre-test score was 8.30gm/dl, the mean haemoglobin level of post test score was 9.8gm/dl. The mean difference with 95% confidence interval was 1.49 and the percentage difference from baseline with 95% confidence interval was 17.8%. In the control group, the mean haemoglobin level of pre-test score was 8.40gm/dl, the mean haemoglobin level of post test score was 8.94gm/dl. The mean difference with 95% confidence interval was 0.53 and the percentage difference from baseline with 95% confidence interval was 5.92%. These differences show that, the effectiveness of fenugreek leaves with elemental iron was more.

The above objective was supported by **Yadav. et.al (2012)** fenugreek leaves with its beta carotene 19mg/100 g of leaves, ascorbic acid of 220.97mg/100g content along with,minerals,zinc,calcium from fenugreek juice may have a

positive impact in the mobilization of stored iron and increase haemoglobin levels of anaemic womens. Results show median iron absorption from the meal ingested with amaranths leaves juice was 7.2%. Iron absorption from the meal included amaranths leaves tended to correlate with transferring receptor concentration (p=0.051). median iron absorption from the meal ingested with fenugreek juice was 8.7%.iron absorption from the meal that included fenugreek leaves juice along with elemental iron was significantly correlated with serum ferritin concentration (p=0.02); They conclude fenugreek leaves is effective than amaranths leaves.

**Objective-V**

**To associate the findings with the selected demographic variables and clinical variables with haemoglobin level among women in experimental group.**

To associate the findings with selected demographic, clinical variables that those in age (x2=3.49, p=0.05*), more income(x2=9.95, p=0.01*), menstrual history regular (x2=1.98, p=0.05*), Flow of menstrual cycle ($\chi$2=3.84 p=0.03*) women having no conception (x2=11.86, p=0.01*), of women gained more haemoglobin. Statistical significance was calculated using chi square test. This study analysis revealed that there was a significant effect of fenugreek leaves with elemental iron on improving blood haemoglobin level among women.

The above objective supported by the following study conducted by the **National Health and Family Welfare Survey (2005-2006)** 3262 women from 8 districts the prevalence of anaemia two-thirds were found in this 19% were moderate to severe. The anaemia significance high in rural women those belonging to the scheduled tribes. There is a strong association in socio economic status, illiteracy in anaemia.

The assumption of the study was fenugreek leaves juice with elemental iron may have some effect on haemoglobin level is hereby accepted because the present study results also have proved that,

The overall findings of the study showed that fenugreek leaves juice with elemental iron was effective. Iron will absorbed easily in acidic environment and biological values in fenugreek leaves is more ascorbic acid and beta carotene, minerals and also it is tasty to drink thereby improving the level of haemoglobin on anaemia among women in experimental group. Thus as a community health nurse the researcher has educated the women about the benefits of fenugreek leaves juice with elemental iron the end of the study.

**Hypothesis $H_1$:**

**There is a significant difference between pre-test and post-test haemoglobin level among anaemic women between the experimental group and control group.**

In experimental group, Pre-test none of the women are not in no anaemia category,10.0%(3) women had mild anaemia,50.0%(15) women had moderate anaemia,30.0%(9) women had severe anaemia, 10.0%(3) women had life threatening anaemia of women with below normal haemoglobin levels have improvement in the haemoglobin level after the intervention 13.3%(4) women had normal haemoglobin level,56.7%(17) women had mild anemia,26.7%(8) women had moderate anaemia,3.3%(1) women had severe anaemia none of women are life threatening anaemia.

In control group, pre-test none of the women are not in no anaemia category, 16.7% (5) women had mild anaemia, 50 %( 15) women had moderate anaemia, 26.7 %( 8) women had severe anaemia, 6.7 %( 2) women had life threatening anaemia. In post-test none of the women are not anaemic, 40 %( 12) women had mild anaemia, 50.0 %( 15) women had moderate anaemia, 10 %( 3)

women had severe anaemia and none of the women are having life threatening anaemia. Even though the haemoglobin gain occurred in control group also, compared with experimental group it is minimal. Thus the hypotheses is proved.

**Hypothesis H2:**

**There is significant association between certain demographic and clinical variables with increased haemoglobin level among anaemic women in experimental group.**

In experimental group certain demographic and clinical variables that those in age (x2=3.49, p=0.05*), more income (x2=9.95, p=0.01*), menstrual history regular (x2=1.98, p=0.05*), Flow of menstruation ($\chi$2=3.84 p=0.03*) women having no conception (x2=11.86, p=0.01*), of women are increased haemoglobin level in experimental group thus the hypotheses was accepted.

# CHAPTER - VII

# CONCLUSION

# &

# RECOMMENDATIONS

# CHAPTER-VII

# CONCLUSION AND RECOMMENDATIONS

Iron deficiency is the most common etiological factor in anaemia. The decreased haemoglobin level is called as iron deficiency anaemia. When the iron level is decreased in human body, it is called as iron deficiency. Iron deficiency anaemia will be prevented by adequate dietary intake of iron rich foods. Iron is one of the micronutrient. It is used for formation of haemoglobin, oxygen transportation, birth development, regulation of body temperature and muscle activity. Fenugreek leaves juice with elemental iron was effective. Iron will absorbed easily in acidic environment and biological values in fenugreek leaves is more ascorbic acid and beta carotene, minerals and also it is tasty to drink thereby improving the level of haemoglobin on anaemia among women

## 7.1 Implications of the study

### 7.1.1 Nursing practice

- The community health nurses have a vital role in providing information for all the women.
- The community health nurse as a service provider should periodically organize and conducts mass education program regarding iron deficiency anaemia awareness.
- Fenugreek leaves juice is locally available and to eat and have high vitamin–c content and enhances in iron absorption thereby increasing haemoglobin level, and the iron tablets is available at free of cost for every government hospital. The community health nurse must implement information education and communication (IEC) to create awareness to the community on the benefits fenugreek of leaves and other vitamin c fruits, and iron tablets.

### 7.1.2 Nursing administration

- The community health nurse as an administrator should design formal teaching programme on women with anaemia and its prevention, using pharmacological and various non-pharmacological methods in improving blood haemoglobin level.
- She should organize for women with anaemia camps collaboration with nursing students attending the primary health centre and along with other NGO's and it should be properly communicated to the public through mass media.

### 7.1.3 Nursing education

- As a nurse educator, we must strengthen the concept of non-pharmacological methods for management of anaemia along with iron supplementation.
- Nursing education should emphasize more on preparing the nurses to impart current changes in health information and to update the knowledge in all fields.
- Nursing curriculum to be equipped with knowledge regarding various health information.

### 7.1.4 Nursing research

- Nurses should conduct periodic review of research findings and disseminate the findings through conferences, seminars and Publication in Professional, National and International Journals and in the Website

## 7.2 Limitations

- The investigator divided the 60 samples as 30 samples for 15 days (30 experimental group and 30 control group) for the proper supervision by home visit daily.

- Some samples are hesitated to accept the taste of fenugreek leaves juice and refused to take on daily. So these samples were excluded from the study.

### 7.3 Recommendation for further studies

- An information booklet can be prepared as a teaching aid in the health centres and outpatient clinics regarding the home management of anaemia.
- The same study could be conducted in a large sample to generalize the results.
- The study could be replicated in different settings with similar facilities.
- A similar study could be conducted by using Solomon four group design.
- The study could be conducted with measuring other biological parameter.e.g. Serum ferritin level.
- The study could be conducted with other available local resources e.g. Amla, Guava, lemon, gooseberry.
- The women should be educated by means of mass health awareness programs on anaemia.

## Conclusion

Adequate level of haemoglobin is very essential for every healthy person. Administration of fenugreek leaves powder juice with elemental iron is simple and easy to implement and most acceptable method for anaemic clients. The finding of the study supports this intervention for women with anaemia which is best intervention to promote haemoglobin level. The clinical and community health nurse should understand the importance of haemoglobin level among women and to attend to the women with anaemia with these types of natural treatment modalities along with pharmacological drugs.

# REFERENCES

## REFERENCES

### BOOKS


1. Allender, A. (2010). *Women's health. Community Health Nursing*, (7thed), Elsevier publication, Page No-82 – 105.
2. Ann. M, (2002), *"Nursing theories and their work"*, (3rded), Philadelphia. Mosby publications. Page No-25-32.
3. Banerjee, S.R., (1995), *"Community and Social Medicine"*, (91sted), New Delhi, jaypee brothers publications. Page No-78-102.
4. Basavanthappa, B.T., (1998), *"Community Health Nursing",* (6thed), New Delhi, Jaypee Brothers Publications, Page No-37-40.
5. Basavanthappa, B.T., (2009), *"Nursing research",* (4thed), New Delhi, Jaypee Brothers Publications, Page No-65-82.
6. Dhaar GM, Rabbani I, (2008), *"Foundations of Community Medicine",* (2nded), New Delhi, Elsevier publication, Page No-52-65,74-95.
7. Dorothy, R. Marlow., (1998), *"Text book of paediatric nursing",* (6thed), Philadelphia, W.B.saunders Company, Page No-378-340, 1133-1136.
8. Dr. U.N.Panda, (2007), *"Hand book of Paediatrics",* New Delhi, CBS publisher.
9. Ghai.O.P. (1993), *"Essentials of paediatrics",* (3rded), New Delhi, Interprint publishers, 214-215.
10. Ghosh, B.N., (1993), *"Hygienic and Public Health"*, (14thed), Calcutta, Scientific publications, Page No-191-193.
11. Gulani.K.K. (1998), *"Community Health Nursing Practice"* (1st Ed), Neelam kumari publishers, Page No -122-124.
12. Gupta, (2000), *"S.P.Statistical Method"*, (5thed), New Delhi, sultan Chand publications Page No -15-41.
13. Indian Academy of Paediatrics, (2007), *"Text book of Paediatrics"*, (4thed), New Delhi, Jaypee brother publications.

14. K.Park. (2011), *"Text book of preventive and social medicine",* (21st ed), Jabalpur, Jaypee brothers publication, Page No -15-48, 58-88,105-189.
15. Lal S, Pankaj A. *"Textbook of Community Medicine"* (Preventive and Social Medicine).1st Ed. New Delhi: CBS Publishers and Distributors; 2007; Page No-166-168.
16. Mathur JSS., *"A comprehensive text book Social Medicine*".1st ed. New Delhi: CBS Publishers and Distributors; Page No - 382-389.
17. Mosby's., (1992), *"Manual of Clinical Nursing*, (2nd ed), Elsevier Publications, Page No-141-192.
18. Polit D.F, Hugler, B.P., (2000), *"Nursing research"*, (6th ed), New York, J.P.Lippincott& company.
19. Prabhakara. G.N (2007), *Textbook of community health nursing"*, (1st ed) Jaypee publishers.
20. Rao, K.S., (2005), *"An introduction to community health nursing"*, (3rd ed), Chennai, B.I.publications Page no: 45-58.
21. Stanhope, (2008), *"Community health nursing"*, (7th ed), Philadelphia, Elsivier publication, Page no: 352-355.
22. Sumathi, (2004), *"Fundamentals of food and nutrition research and diet therapy",* (5th ed), New Delhi, International publication Page no: 43-65.
23. SundarLal. (2009), *"Text book of Community Medicine",* New Delhi, CBS publisher, Page no: 67-135.
24. Suresh K.Sharma (2015), *"Nursing research &Statistics"* (7th ed), Rishikesh, Elsivier publication.
25. Swaminathan.DR.M. (2008), "*Advanced Text book on Food and Nutrition"*, Bangalore, Bappco Publisher publications.
26. Talboot, KL.A, (1995), *"Principles and practice of nursing research",* (16th ed), Missouri, Mosby Publications.
27. Wongs, (2009), *"Essentials of Paediatric Nursing"*, (8th ed), India, Mosby publisher.

**JOURNALS**


1. Aggarwal KB, Ranjan JK, Rathore SS, Saxena SN, Mishra BK. Changes in physical and biochemical properties of fenugreek (*Trigonella* sp. L.) leaf during different growth stages. International Journal of Seed Spices 2013; 3(1):31-35.
2. Ahmed F, Anaemia and iron deficiency among women, European journal of clinical nutrition, 2000, 54(9), page no: 678-683.
3. Anne C Looker, Prevalence of iron deficiency anaemia, The journal of American medical association, March 1997, 277(12), Page no: 973-975.
4. Arnold DL et al. Iron deficiency anaemia cigarette smoking and risk of abruptio-placentae. American Journal of Clinical Nutrition. 2009; Vol-85, Page no: 78-83
5. Aswathis, Pande, V.K, Prevalence of malnutrition and intestinal parasites in preschool children in Lucknow, The Journal of Indian Pediatrics, 35(9), page no: 34-36.
6. Chandrasekar.K, Indian journal of public health Research & Development, prevalence of anaemia among adolescent girls in urban areas, 2011, 2 (1), page no; 111-113.
7. Chaudhry SM, "A study of Anaemia among females" in the urban area of Nagpur in India, Journal of Community Medicine, October 2008, Volume 33, Page No: 243-245.
8. Deshmuk P.R, "Effectiveness of Weekly Supplementation of Iron to Control Anaemia among women", published in the Journal of Health Population and Nutrition, March 2008, Volume 26, Page No: 74-78.
9. Dimri,G.P, Physical work capacity of Indian adolescent girl, Indian journal of nutrition and dietetics, 43(23), page no: 392.
10. Dr. Anant Mohn. Anaemia is on the rise in India, says NFHS report. Agencies. Delhi: 2008.

11. Erum S, Anwar R, Masood S. Evaluation of kasuri methi (*Trigonella foenum-graecum*l.) var. to establish GI right of Pakistan. Pakistan Journal of Agricultural Sciences 2011; 24:1-4.
12. F.W. Lane et al. Investigated the relationship between maternal anaemia and perinatal outcome in a cohort. Eastern Mediterranean Health Journal. 2004; Vol-10(6); Page 8001-8007.
13. Fotopoulos C. Marketing in: GA. Petropoulos (Ed.).Fenugreek - The genus *Trigonella*, Taylor and Francis, London and New York 2002; 183-195.
14. Hilary M, Improving dietary intake to prevent anaemia in adolescent girls through community kitchens, the journal of nutrition, 5th February 2000, page no: 459-467.
15. Hotz C et al. Efficacy of iron-fortified Ultra rice in improving the iron status of women. American Journal of Clinical Nutrition. 2007; Vol-85(4): 1127-1133.
16. Javanmardia JB, Stushno CB, Lockeb E, Vivancob JM.Antioxidant activity and total phenolic content of Iranian *Ocimum* accessions. Food Chemistry 2003; 83:547-550.
17. Kramipour R, "Prevalence of Iron Deficiency Anaemia among Adolescent School Girls" form Kermanshah, western Iran, published in the Journal of Haematology, December 2008, Volume 13, Page no: 352-355.
18. Lechting A et al. Decreasing stunting, anaemia and Vit A deficiency in Peru: result of the good start in life program. Food and Nutrition Bulletin. 2009; Vol-30(1): Page 37-38.
19. Mehnaz .S et al. Impact on iron, folate Vit C supplementation on the prevalence of iron deficiency anaemia in non-pregnant female. Indian Journal of Community Medicine. 2006; Vol-3: Page 30.
20. Mehrafarin A, Qaderi A, Rezazadeh S, Badi HN,Noormohammadi G, Zand E *et al*. Bioengineering of important secondary metabolites and metabolic

pathways in Fenugreek (*Trigonella foenum-graecum L.)*.Journal of Medicinal Plants 2010; 9:1-18.

21. Melaku Umeta et al. Iron deficiency among reproductive age group. Ethopian Journal of Health. 2008; Vol-22(3): Page 252-258.
22. Mendez Estraada Reo et al. Prevalence of iron deficiency and iron deficiency anaemia in pregnant adolescent. Archivo Latinoamericano de Nutrition. 2007; Vol-58(2): 47-51.
23. Ministry of Health and Family Welfare. Community level Interventions to prevention and treatment of anaemia. 2005-2006; Vol-1.
24. Mittal.M, International journal of pharmacy and pharmaceutical sciences, An intervention on iron deficiency anaemia, august 2010, 3(1), page no: 311-312.
25. Nahala Hawalla et al. Iron deficiency is an important contributor to anaemia among reproductive age women. Ecological of Food and Nutrition. 2004; Vol-43: Page 77-92.
26. National journal of community medicine, Prevalence of anaemia among adolescent girls in an urban slum, March 2012, 3(1), Page no: 211.
27. Ndiaye H et al. Impact of a positive deviance Approach to improve the effectiveness of an Iron supplementation programme to control nutrition anaemia. Food and Nutrition Bulletin. 2009; Vol-2: Page 128-136
28. Pasricha V, Satpathy G, Gupta RK. Phytochemical &Spices in India have paramount importance which is widely used as medicines.
29. Petropoulos GA. Fenugreek - The genus *Trigonella,*Taylor and Francis, London and New York 2002; 255.
30. Rawat Metal, prevalence of anaemia among women girls, U.P. Indian journal of public health, 2001, 5(3), page no: 56-58.
31. Rohini, nutritional intervention for iron and Vitamin A deficient school children, The Indian journal of nutrition and dietetics, 42(46):51-52.

32. Sanjeev M Choudry, A study among women, Indian journal of community medicine, October (2008), 33(4), page No: 243-245.

33. Sen A "Deleterious Functional Impact of Anaemia among Adolescent School Girls", The Journal of Indian Paediatrics, March 2006, volume 43, Page No: 219-226.

34. Shah BK, Gupta P. Weekly Vs daily iron and folic acid supplementation in adolescent Nepalese girls. Arch Paediatric Adolescenct Medicine 2002; 156:131-135.

35. Sheshadri, S, Weekly supplementation of iron in rural areas, Indian journal of females.22 (14):25-26.

36. Shilpa S. Biradar, Prevalence of anaemia among women, Journal of clinical and diagnostic research, May 2012, 6(4), Page no: 372-377.

37. Shobha S, Efficacy of twice weekly iron supplementation in anemic adolescent girls, Indian journal of Lancet, 2003, 40 page no: 1186-90.

38. Singh BN, Singh BR, Singh RL, Prakesh D, Sarma BK,Singh HB. Antioxidant antiquorum sensing activities of green pod of *Acacia nilotica* L. Food and Chemical Toxicology 2009; 47:778-786.

39. Srijaya, M, Energy balance in selected anaemic adolescent girls, National medical journal, 51(21):42.

40. Sumayya AR, Srinivasan S, Amatullah N. Screening and biochemical quantification of phytochemicals in Fenugreek (*Trigonella foenum-graecum*) Research Journal of Pharmaceutical, Biological and Chemical Sciences 2012; 3(1):165-169.

41. Tatala SR, "Risk Factors for Anaemia in women" in Tanga region, Tanzania, published in the Tanzan Journal of Health, October 2008, volume 10, Page No: 189-202.

42. Thankachan, Influence of family's vegetable cultivation on prevalence of anaemia among adolescent girls, National medical journal of India, 21(34), page no: 23.
43. TotejaG.S.Singh, Journal of community medicine, Prevalence of anaemia among non-pregnant women and pregnant women in 16 districts, December 2006, Page no: 311-315.
44. Yon Ho Choe, MD, Helicobacter pylori-associated iron-deficiency anaemia in adolescent female athletes, The journal of Lancet, July 2001, Page No:100-104

**WEBSITES**


www.bing.com

www.incmindia.org

www.indianjournals.com

www.indmedica.com

www.ijppsjournal.com

www.ingentaconnect.com

www.ncbi.nlm.nih.gov

www.Phytochemical.com

www.who.in

www.cmaj.com

www.ayurveda.com

www.wikipedea.com: Iron deficiency anaemia.

www.whoint/nutrition/topics/ida/index.html

www.wrongdiagnosis.com/i/iron-deficiencyanemia

http://lex123.hubpages.com/hub/Wonderful-Health-Benefits-of-fenugreek leaves

Available from URL: http://justeat.in/articles/fruits/benefits-of- fenugreek leaves

# APPENDICES

**INSTITUTIONAL ETHICS COMMITTEE**
**MADRAS MEDICAL COLLEGE, CHENNAI-3**

EC Reg No.ECR/270/Inst./TN/2013
Telephone No. 044 25305301
Fax : 044 25363970

## CERTIFICATE OF APPROVAL

To
Ms. VISITHRAJ
M.Sc., (Nursing)
College of Nursing
Madras Medical College,
Chennai – 600 003.

Dear Ms. VISITHRAJ,

The Institutional Ethics Committee has considered your request and approved your study titled **A STUDY TO ASSESS AND COMPARE THE EFFECTIVENESS OF FENUGREEK LEAVES WITH ELEMENTAL IRON AND ELEMENTAL IRON ALONE ON ANEMIA AMONG WOMEN RESIDING IN SELECTED COMMUNITY AT CHOOLAI. No.19102014.**

The following members of Ethics Committee were present in the meeting held on 21.10.2014 conducted at Madras Medical College, Chennai-3.

| | |
|---|---|
| 1. Dr.C.Rajendran, M.D., | : Chairperson |
| 2. Dr.R.Vimala, M.D., Dean, MMC, Ch-3 | : Deputy Chairperson |
| 3. Prof.B.Kalaiselvi, M.D., Vice-Principal, MMC, Ch-3 | : Member Secretary |
| 4. Prof.R.Nandhini, M.D., Inst.of Pharmacology, MMC | : Member |
| 5. Prof.K.Ramadevi, Director i/c, Inst.of Biochemistry, MMC | : Member |
| 6. Prof.Saraswathy, M.D., Director, Pathology, MMC, Ch-3 | : Member |
| 7. Prof.S.G.Sivachidambaram, M.D., Director i/c, Inst.of Internal Medicine, MMC | : Member |
| 8. Dr.Raghumani, M.S., Professor of Surgery, MMC | : Member |
| 9. Thiru S.Rameshkumar, Administrative Officer | : Lay Person |
| 10.Thiru S.Govindasamy, B.A., B.L., | : Lawyer |
| 11.Tmt.Arnold Saulina, M.A., MSW., | : Social Scientist |

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

31/10/14

Member Secretary, Ethics Committee

## CERTIFICATE FOR CONTENT VALIDITY

This is to certify that the tool constructed by Ms. J.Visithra, M.Sc. Nursing II year, College of Nursing, Madras Medical College which is to be used in her study titled **"A STUDY TO ASSESS AND COMPARE THE EFFECTIVENESS OF FENUGREEK LEAVES WITH ELEMENTAL IRON AND ELEMENTAL IRON ALONE ON ANEMIA AMONG WOMEN RESIDING IN SELECTED COMMUNITY AT CHOOLAI."** has been validated by the undersigned. The suggestions and modifications given by me will be incorporated by the investigator in concern with their respective guide. Then she can proceed to do the research.

(Dr. JOY PATRICIA)

SIGNATURE WITH SEAL

Director
Institute of Community Medicine
Madras Medical College & RGGGH
Chennai - 600 003.

NAME : Dr. JOY PATRICIA PUSHPARANI M.D

DESIGNATION: Professor and H.O.D of community Medicine,

COLLEGE : Madras Medical college, Chennai-03

PLACE: Chennai-03.

DATE: 13.07.15

## CERTIFICATE FOR CONTENT VALIDITY

This is to certify that the tool constructed by Ms. J.VisithraM.Sc. Nursing II year, College of Nursing, Madras Medical College which is to be used in her study titled **"A STUDY TO ASSESS AND COMPARE THE EFFECTIVENESS OF FENUGREEK LEAVES WITH ELEMENTAL IRON AND ELEMENTAL IRON ALONE ON ANEMIA AMONG WOMEN RESIDING IN SELECTED COMMUNITY AT CHOOLAI."** has been validated by the undersigned. The suggestions and modifications given by me will be incorporated by the investigator in concern with their respective guide. Then she can proceed to do the research.

V. Ebigolda

SIGNATURE WITH SEAL

NAME : EBI GOLDA MARY.V

DESIGNATION: READER

COLLEGE : MADHA COLLEGE OF NURSING

MADHA COLLEGE OF NURSING
15 JUL 2015
CHENNAI - 600 069

PLACE: KUNRATHUR

DATE: 15-07-2015

From

Deputy Commissioner (Health)
Public Health Department
Corporation of Chennai
Ripon Building, Chennai-600003

To

The Principal,
College of Nursing,
Madras Medical College,
Chennai-600003

HD.Roc.No.C1/ 4158/2015 Dt. 23.07.2015

Dear Madam,

Sub: Corporation of Chennai-Public Health Department-College of Nursing-Madras Medical College - Requesting permission for MSc-II year Nursing students study proposed at community area Choolai, Chennai- permission orders issued - regarding.

Ref: Your Letter Dt.07.07.2015.

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With reference cited above, the Corporation of Chennai is happy to grant you permission to a study to evaluate the following subjects in selected urban area at choolai.

| S.No. | NAME OF THE STUDENT | DISSERTATION TOPICS |
|---|---|---|
| 1 | Jaganathan Rajeswari | A study to assess the efectioveness of holy basil leaves extract in reducing blood sugar amoung diabetes mellitus clients in selected urban area at Choolai. |
| 2 | Ramya.A | A study to evaluate the effectiveness of amla juice with honey in the control of bloold pressure among hypertensive client in seleted urban areat at Choolai |
| 3 | Sangeetha.V | A study to assess the effectiveness of soya milk with honey consumption on reducing physical and physiological symptoms amoung the post-menopausal women with in age group 40-60 years at Choolai |
| 4 | Visithra J | A study to assess and compare the effectiveness of fenugreek leaves with elemental iron and elemental alone on anemia among women residing in selected community at Choolai. |

The permission for the study is granted with the following conditions.

1. The study should be conducted as per the request. The study should be conducted in one month, from the date of permission.
2. The Corporation of Chennai will not provide any monitory or human resources support for the study.
3. The details of the study should be submitted to the City Health Officer (i/c), Corporation of Chennai by the candidates before any formal publication.
4. No wrong reporting of Corporation of Chennai should be carried out.

Best wishes,

For Deputy Commissioner (Health) 2/2

## RESEARCH TOOL

## PART-A

## DEMOGRAPHIC DATA

**INSTRUCTIONS:**

- Read each item carefully and answer all the questions.
- Answers will be used only for research purpose and will be confidential.
- Please be frank and free in answering the question.
- Please put a tick mark at the appropriate option.
- Please return back the questionnaire after answering all the questions.

S.NO _ _ _ _ _ NAME _ _ _ _ _ _ _ _ _ _ _ _

## SECTION -A

## DEMOGRAPHIC VARIABLES:

1. Age in years
   a. 25-30 year ☐
   b. 31-35 years ☐
   c. 36-40 years ☐
   d. 41-45 years ☐
2. Religion
   a. Hindu ☐
   b. Christian ☐
   c. Muslim ☐
   d. Others ☐
3. Educational status
   a. No formal education ☐
   b. Primary education ☐
   c. High school education ☐
   d. Higher secondary ☐
   e. Graduate ☐

4. Occupation

a. Home maker ☐
b. Government employee ☐
c. Private employee ☐
d. Self-employee ☐

5. Marital Status

a. Married ☐
b. Unmarried ☐
c. Divorced ☐
d. Widower ☐

6. Monthly family income in Rupees

a. < Rs.4726 ☐
b. Rs.4727-7877 ☐
c. Rs.7878-11816 ☐
d. > Rs.11817 ☐

7. Dietary habits

a. Vegetarian ☐
b. Non vegetarian ☐

8. Which food contains rich in iron

a. Drumstick leaves ☐
b. Dates ☐
c. Fenugreek leaves ☐
d. .Jaggery ☐

9. History of deworming previously

a. Yes ☐
b. No ☐

10. If yes means when?

a. < 3month ☐
b. < 6month ☐
c.more than 6month ☐

## SECTION-B

1. Age at menarche
   - a.10-12 year ☐
   - b.13-15 year ☐
   - c.16-18 year ☐
2. Menstrual history
   - a.Regular ☐
   - b.Irregular ☐
3. Flow of menstrual cycle
   - a. < 5days ☐
   - b.> 5days ☐
4. Frequency of your menstrual flow
   - a. <28 days ☐
   - b.28 days ☐
   - c. >28 days ☐
5. Pads used/day
   - a.2-4 pads/day ☐
   - b. 5-8 pads/day ☐
   - c.9-12 pads/day ☐
6. Number of times you have conceived (gravida) in your life
   - a.No ☐
   - b.One ☐
   - c.Two ☐
   - d.Three ☐
   - e.More than three ☐
7. Do you have any medical problems
   - a.No ☐
   - b.Diabetes Mellitus ☐
   - c.Cardiac problems ☐
   - d.others (specify) ☐

| Score Interpretation: According To UNICEF | |
|---|---|
| **Level of haemoglobin** | **Level of Anaemia** |
| >10.9 gm/dl | No Anaemia |
| 9.5 to 10.9 gm/dl | Mild Anaemia |
| 8.0 to 9.4 gm/dl | Moderate Anaemia |
| 6.5 to 7.9 gm/dl | Severe Anaemia |
| < 6.5 gm/dl | Life Threatening Anaemia |

**வினாத்தாள்**

**புள்ளி விபர ஆய்வு மாற்றுரு**

**பகுதி - அ**

**மாதிரி எண்.____ பெயர்:---------- விலாசம்:**

1) வயது வரம்பு வருடங்களில்

அ) 25-30 வருடம் ☐

ஆ) 31-35 வருடம் ☐

இ) 36-40 வருடம் ☐

ஈ) 41-45 வருடம் ☐

2) மதம்

அ) இந்து ☐

ஆ) கிருத்துவர்கள் ☐

இ) முஸ்லிம் ☐

ஈ) மற்றவை ☐

3) படிப்பு தகுதி

அ) முறையா ன கல்வி பாயிலாதவர் ☐

ஆ) ஆரம்ப கல்வி ☐

இ) நடு நிலை கல்வி ☐

ஈ) மேல் நிலைகல்வி ☐

உ) பட்டப்படிப்பு ☐

4) தொழில் வகைப்பாடு

அ) வீட்டுவேலை ☐

ஆ) அரசு வேலை ☐

இ) தனியார் துறை வேலை ☐

ஈ) சுய தொழில் ☐

5) திருமண நிலை

அ) திருமணமாகாதவர் ☐

ஆ) திருமணமானவர் ☐

இ) விவாகரத்தானவர் ☐

ஈ) விதவை ☐

6) குடும்ப மாத வருமானம் ரூபாயில்

அ) < ரூ 4726 ☐

ஆ) ரூ 4227-7877 ☐

இ) ரூ 7878-11816 ☐

ஈ) > ரூ11817 ☐

7) உணவு பழக்க வழக்கம்

அ) சைவ உணவு ☐

ஆ) அசைவ உணவு ☐

8) எந்த உணவில் அதிக அளவு இரும்பு சத்து உள்ளது.

அ) முருங்கை கீரை ☐

ஆ) பேரிட்சைப்பழம் ☐

இ) வெந்தய கீரை ☐

ஈ) வெல்லம் ☐

9) இதற்கு முன் குடற்புழு நீக்கும் பழக்கம் உள்ளவரா?

அ) ஆம் ☐

ஆ) இல்லை ☐

10) ஆம் எனில் எப்போது

அ) <3மாதங்கள் ☐

ஆ) <6மாதங்கள் ☐

இ) 6மாதத்திற்கு மேல் ☐

## பகுதி - ஆ

1. பூப்படைதல் எந்த வயது வரம்பில் அடைந்தீர்கள்

அ) 10-12 வயது ☐

ஆ) 13-15 வயது ☐

இ) 16-18 வயது ☐

2.மாதவிடாய் சுழற்சி

அ) வழக்கமான ☐

ஆ) வழக்கமில்லாத ☐

3.மாதவிடாயின் போது உதிரப்போக்கு வரும் நாட்களின் எண்ணிக்கை

அ) 5 நாட்களுக்கு குறைவாக ☐

ஆ) 5 நாட்களுக்கு மேல் ☐

4.மாதவிடாய் சுழற்சி எத்தனை நாட்களுக்கு ஒருமுறை வருகிறது?

அ) 28 நாட்களுக்கு குறைவாக ☐

ஆ) 28 நாட்கள் ☐

இ) 28 நாட்களுக்கு மேல் ☐

5.மாதவிடாயின் போது ஒரு நாளில் பயன்படுத்தும் பஞ்சுகளின் எண்ணிக்கை

அ) 2-4பஞ்சுகள் ☐

ஆ) 5-8பஞ்சுகள் ☐

இ) 9-12பஞ்சுகள் ☐

6. நீங்கள் எத்தனை முறை உங்கள் வாழ்நாளில் கர்ப்பம் அடைந்தீர்கள்

அ) இல்லை ☐

ஆ) ஒன்று ☐

இ) இரண்டு ☐

ஈ) மூன்று ☐

உ) மூன்றுக்கு மேல் ☐

7.உங்களுக்கு வேறு எதேனும் நோய் உள்ளதா?

அ) இல்லை ☐

ஆ) சர்க்கரை நோய் ☐

இ) இருதய நோய் ☐

ஈ) மற்றவை ☐

## PROCEDURE

## PREPARATION OF FENUGREEK LEAVES POWDER JUICE

### Definition

This is a juice prepared from fenugreek leaves.

### Purpose

Fenugreek leaves is containing high vitamin A, C and iron which enhance easy absorption and increase iron level.

### Preparation of the client

Explain the procedure to the women, and explain about the action of Fenugreek leaves juice.

### Sources of Fenugreek leaves juice

From dry fenugreek leaves powder.

### Preparation of fenugreek leaves juice

5 gram of fenugreek leaves powder mixed with 100 ml of water given after breakfast daily for 14 days.

### Action of fenugreek leaves juice

Fenugreek leaves powder mixed with 100 ml of water has remedy to various health problems like easy absorption of iron, healthy skin improve the immune system etc. Fenugreek leaves juice is taken with iron to promote health, as this helps to absorb iron easily because of their acidic in nature.

### Documentation

Record the procedure with date and time.

**Informed consent form**

**Title of the study : A study to assess and compare the effectiveness of fenugreek leaves with elemental iron and elemental iron alone on anaemia among women residing in selected community at Choolai''.**

**Investigator : Visithra.J**

**Name of Participant :**

**Age :**

**Date :**

**Name of the Institution : Selected community Area. Choolai.**

**Documentation of the informed consent:** (legal representative can sign if the participant is minor or incompetent).

- I _____have read/it has been read for me, the information in this form. I was free to ask any questions and they have been answered. I am over 18 years of age and exercising my free power of choice, hereby give my consent to be included as a participant in the study.
- I have read and understood this consent form and the information provided to me.
- I have had the consent document explained in detail to me.
- I have been explained about the nature of my study.
- My rights and responsibilities have been explained to me by the investigator.

- I agree to cooperate with the investigator and I will inform her immediately if I suffer from unusual symptoms.
- I have not participated in any research study at any time.
- I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my future treatment in this hospital.
- I hereby give permission to the investigators to release the information obtained from me as a result of participation in this study to the regulatory authorities, government agencies and Institutional ethics committee.
- I understand that they are publically presented; my identity will be kept confidential.
- I am aware that I have any question during this study; I should contact the concerned investigator.

Signature of Investigator

Signature of participants

Date

Date

**Information to the participants**

**Title of the study : A study to assess and compare the effectiveness of fenugreek leaves along with elemental iron and elemental iron alone on anaemia among women residing in selected community at Choolai Chennai''.**

**Name of the investigator: Visithra.J**

**Name of the Participant:**

**Age :**

This study is conducted in urban area Choolai, Chennai. You are requested to take participate in this study. The information in this document is meant to help you decide whether or not to take part. Please feel free to ask if you have any queries or concerns. You are being asked to co-operate in this study being conducted in Choolai. Chennai-03.

**What is the purpose of this study (explain briefly)**

Anaemia is the most common form of malnutrition among adolescent girls and women. It is of public health significant problem in our country. Family health survey indicates 55% of women are anemic. Both urban and rural women's suffer from anaemia and being more in girls than boys poor economic status, faulty dietary pattern, lack of awareness, urbanization, prevalence of malaria, hook worm infestations, repeated bacterial infections also influence the incidence and nature of anaemia among women. In this study we want to test haemoglobin level in red blood cells. And the effect of fenugreek leaves in reversing the symptoms of anaemia. There was a positive correlation between knowledge of anaemia and its remedial measures. Two compounds were isolated from the fenugreek leaves and stem of, spectral analysis.

Fenugreek, since it is an excellent source of nutrients such as iron, fats, proteins, carbohydrates, vitamins and minerals.

Samples can also take their regular diet and medication.

Patient diagnosed with anaemia on treatment will be enrolled. Haemoglobin is analysed by haemoglobinometer.at free of cost. 100 mg of elemental iron capsule and 5gm of fenugreek leaves powder mixed with 200ml of water given under supervision for a period of 14 days .Post-test haemoglobin is estimated on 15$^{th}$ day after the administration of fenugreek leaves powder, checked for increasing haemoglobin level among anaemia women's. If u notice any adverse event you have to report it.

**Possible Risks to you**

No risks involved.

**Possible benefits to you**

After finishing this study, investigator will provide information that the fenugreek leaves powder will increase the haemoglobin level and reducing the risk of anaemia symptoms like tiredness, irritability, sweating, dyspnoea etc., And gain knowledge about its prevention.

**Possible benefits to the other people**

The results of the research may provide benefits to the society in terms of advancement of knowledge regarding natural home remedies benefits to the future patients.

**Confidentiality of the information obtained from you**

You have the right to confidentiality regarding the privacy of your medical information (personal details, results of physical examination, investigations, and your medical history). By signing this document you will be allowing the research team investigators, other study personnel, sponsors, institutional ethics committee and any person or agency required by law like the drug controller general government of India to view your data if required. The

information from this study, if published in scientific journals or presented at scientific meetings, will not reveal your identity.

**How will your decision not to participate in the study affect you?**

Your decisions not to participate in this research study will not affect your activity of daily living, medical care or your relationship with investigator or the institution.

**Can you decide to stop participating in the study once you start?**

The participation in this research is purely voluntary and you have the right to withdraw from this study at any time during course of the study without giving any reasons. However, it is advisable that you talk to the research team prior to stopping the treatment, or discontinuing of procedures etc.

The results of this study will be informed to you at the end of the study.

Signature of investigator Signature of participants

Date Date

**ஆராய்ச்சி ஒப்புதல் படிவம்**

**ஆராய்ச்சி தலைப்பு** : இரத்தசோகை பெண்களுக்கு வெந்தயகீரை உடன் இரும்புச்சத்து மாத்திரை மற்றும் இரும்புச்சத்து மாத்திரை மட்டும் உட்கொள்வதின் மூலம் இரத்தசோகையை குறைப்பதற்கான ஒப்பிடுதல் திறன் ஆய்வு.

**ஆய்வாளர் பெயர்** : ஜெ.விசித்திரா

**பங்கேற்பாளர் பெயர்** :
**வயது** :
**ஆராய்ச்சி சேர்க்கை எண்** :

- ஆய்வாளர் மேற்கொள்ளும் ஆராய்ச்சியில் பங்கேற்க யாருடைய கட்டாயமுமின்றி முழுமனதுடனும் சுயநினைவுடனும் சம்மதிக்கிறேன்.
- ஆய்வாளர் மேற்கொள்ளம் போகும் பரிசோதனைகளை மிக தெளிவாக விளக்கிக்கூறினார்.
- எனக்கு விருப்பமில்லாத பட்சத்தில் ஆராய்ச்சியிலிருந்து எந்நேரமும் விலகலாம் என்பதையும் ஆய்வாளர் மூலம் அறிந்து கொண்டேன்.
- இந்த ஆராய்ச்சி ஒப்புதல் கடிதத்தில் உள்ள விவரங்களை நன்கு புரிந்துக்கொண்டேன். எனது உரிமைகள் மற்றும் கடமைகள் ஆராய்ச்சியாளர் மூலம் விளக்கப்பட்டது.
- நான் ஆராய்ச்சியாளருடன் ஒத்துழைக்க சம்மதிக்கிறேன்.எனக்கு ஏதேனும் உடல் நலகுறைவு ஏற்பட்டால் ஆராய்ச்சியாளரிடம் தெரிவிப்பேன்.
- நான் வேறு எந்த ஆராய்ச்சிலும் தற்சமயம் இடம்பெறவில்லை என்பதை தெரிவித்துக்கொள்கிறேன்.
- இந்த ஆராய்ச்சியின் தகவல்களை வெளியிட சம்மதிக்கிறேன்.அப்படி வெளியிடும்போது என் அடையாளம் வெளிவராது என்பதை அறிவேன்.
- எனக்கு இந்த ஒப்புதல் கடிதத்தின் நகல் கொடுக்கபட்டது.

ஆய்வாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

தேதி தேதி

**<u>ஆராய்ச்சி தகவல் தாள்</u>**

**ஆராய்ச்சி தலைப்பு** : இரத்தசோகை பெண்களுக்கு வெந்தயகீரை உடன் இரும்புச்சத்து மாத்திரை மற்றும் இரும்புச்சத்து மாத்திரை மட்டும் உட்கொள்வதின் மூலம் இரத்தசோகையை குறைப்பதற்கான ஒப்பிடுதல் திறன் ஆய்வு.

**ஆய்வாளர் பெயர்** : ஜெ.விசித்திரா

**பங்கேற்பாளர் பெயர்** :

**வயது** :

இந்த ஆய்வு சென்னை சூளையில் மேற்கொள்ளப்பட உள்ளது.

உங்களை இந்த ஆய்வில் பங்கேற்க அழைக்கின்றோம். நீங்கள் இந்த ஆய்வில் பங்கேற்கலாமா அல்லது வேண்டாமா? என்பதை முடிவு செய்ய இந்த ஆவணத்தில் உள்ள தகவல் உதவியாக இருக்கும்.உங்களுக்கு ஏதேனும் சந்தேகம் இருந்தால் நீங்கள் எங்களிடம் வெளிப்படையாக கேட்கலாம்.

எங்களுடைய அடிப்படை தகுதிகளில் நீங்கள் திருப்தியாக இருப்பதால் உங்களை இந்த ஆய்வில் பங்கேற்க அழைக்கின்றோம்.

**<u>ஆய்வின் நோக்கம் மற்றும் செயல்பாடு</u>**

இரத்தசோகை பெண்களுக்கு வெந்தயகீரை இலை பவுடர் உடன் இரும்புச்சத்து மாத்திரை மற்றும் இரும்புச்சத்து மாத்திரை மட்டும் உட்கொள்வதின் மூலம் இரத்தசோகையை குறைப்பதற்கான திறன் ஆய்வு.

100 மி.கி இரும்பு சத்து மாத்திரை மற்றும் 5 கிராம் வெந்தய கீரை பொடியை 200மி.லி.தண்ணீரில் கலந்து தினமும் காலை உணவு அருந்தியபின் 14 நாட்களுக்கு என் மேற்பார்வையில் கொடுப்பேன்.இதனால் எந்த பக்கவிளைவுகளும் இல்லை என்பதை தெரிவித்துக்கொள்கிறேன்.

இந்த ஆய்வில் உங்களது பெயர்,வயது,இருப்பிடம்,உணவு, முறை பற்றிய தகவல்களை பெற்றுக்கொள்வோம்.

**<u>சில தகவல்கள் உங்களிடம் பெறப்படும்</u>**

உங்களுக்கு உங்களுடைய தகவல்களை இரகசியமாக வைத்துக்கொள்ளும் உரிமை உண்டு.நீங்கள் இந்த ஆய்வில் கையொப்பமிடுவதால் நீங்கள் உங்களுடைய தகவல்களை,ஆய்வுக்குழு மற்றும் நிறுவனத்திடம் காட்ட வேண்டும்.இந்த ஆராய்ச்சியின் தகவல்களை விஞ்ஞான இதழ்கள் மற்றும் விஞ்ஞான கூடத்தில் வெளியிடப்பட்டாலும் உங்களுடைய அடையாளங்கள் காட்டப்படமாட்டாது.

ஆய்வாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

தேதி தேதி

| EXP SAMI | AGE | RELIGION | EDUCATI | OCCUPAT | MARITAL | FAMILY I | DIETARY | RICH IN II | HIS OF DE | YES WHE | MENAR A | MENS.HIS | MENSES I | FREQUEN | PADS/DA | NO OF G | MEDI PR | PRE TEST | DEGREE ( | POST TES | D.ANEMIA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 | a | a | d | a | a | d | b | c | b | c | b | a | a | b | a | b | a | 9.6 | mild | 10.5 | mild |
| 1.2 | a | a | d | a | a | c | a | a | b | c | b | a | a | b | a | c | a | 8.6 | moderate | 9.8 | mild |
| 1.3 | a | a | b | a | a | d | a | b | b | c | b | a | a | a | a | b | a | 9.8 | mild | 11 | Normal |
| 1.4 | c | a | b | d | a | a | b | a | b | c | c | b | a | a | b | c | d | 9.2 | moderate | 10.4 | mild |
| 1.5 | a | a | b | a | b | d | b | b | b | c | b | a | a | b | a | a | a | 8.2 | moderate | 10.6 | mild |
| 1.6 | d | a | b | a | a | c | a | b | b | c | b | a | a | b | a | b | a | 8 | moderate | 10.3 | mild |
| 1.7 | c | c | a | a | a | c | b | a | b | c | b | b | a | b | a | c | a | 7.9 | severe | 9.8 | mild |
| 1.8 | a | c | b | a | d | a | b | b | b | b | a | a | b | b | b | e | a | 6.8 | severe | 8.1 | moderate |
| 1.9 | c | b | c | a | a | d | b | c | b | c | c | a | a | b | b | d | a | 7.4 | severe | 10.8 | mild |
| 1.1 | d | a | e | c | a | b | b | a | a | a | b | a | b | b | b | e | a | 6.2 | life threater | 8.1 | moderate |
| 1.11 | b | b | a | b | c | a | a | b | a | a | b | b | b | a | c | e | d | 9.4 | moderate | 10.8 | mild |
| 1.12 | d | c | e | c | a | b | b | d | b | c | a | a | a | b | b | d | b | 8.8 | moderate | 10 | mild |
| 1.13 | b | a | b | d | c | a | a | c | a | b | c | b | b | c | b | e | a | 6.4 | life threater | 8.6 | moderate |
| 1.14 | b | b | c | c | d | c | a | a | a | a | b | a | a | a | c | d | c | 7.2 | severe | 9.6 | Mild |
| 1.15 | c | c | d | b | c | d | b | b | a | a | a | b | b | c | b | e | a | 7.1 | severe | 8 | Moderate |
| 1.16 | d | a | a | a | a | a | a | c | a | b | a | b | b | a | b | c | a | 8.2 | Moderate | 9.8 | Mild |
| 1.17 | c | a | d | b | a | d | b | a | b | b | c | b | a | a | a | a | b | 8.4 | Moderate | 10.8 | Mild |
| 1.18 | d | c | c | d | c | b | b | c | b | c | a | b | b | a | c | e | c | 7.8 | severe | 8.2 | Moderate |
| 1.19 | b | d | e | c | a | d | b | d | b | c | c | a | a | b | a | b | a | 9.8 | Moderate | 11.2 | Normal |
| 1.2 | c | b | b | d | a | a | a | b | a | a | b | a | a | b | a | b | b | 9.5 | Mild | 10.9 | Mild |
| 1.21 | a | a | d | b | b | d | a | c | a | a | a | a | a | c | a | a | a | 9.3 | Moderate | 10.2 | Mild |
| 1.22 | a | c | b | a | b | b | b | d | b | c | b | b | a | b | b | a | b | 8.6 | Moderate | 9.8 | Mild |
| 1.23 | d | a | e | c | d | b | a | a | a | a | a | b | b | c | b | e | c | 7.3 | severe | 9.1 | Moderate |
| 1.24 | b | c | a | d | a | a | b | b | b | c | b | a | a | b | a | b | a | 9.1 | Moderate | 10.2 | Mild |
| 1.25 | c | a | a | a | d | c | a | d | b | b | c | a | a | c | a | a | a | 9 | Moderate | 11 | Normal |
| 1.26 | b | b | b | a | a | d | a | c | a | a | b | a | a | a | b | c | a | 9.4 | Moderate | 10.5 | Mild |
| 1.27 | c | b | b | a | a | a | a | a | b | c | a | a | a | a | b | d | a | 7 | severe | 8.6 | Moderate |
| 1.28 | d | b | c | c | c | b | b | a | a | b | c | b | b | c | c | e | c | 6.3 | life threater | 7.5 | severe |
| 1.2 | a | b | e | b | b | c | a | c | b | b | b | b | b | a | b | a | d | 10.9 | Moderate | 11.3 | Normal |
| 1.3 | b | c | c | d | b | c | b | b | a | b | b | b | b | c | c | a | a | 7.9 | severe | 8.4 | Moderate |

CONTROL

| | | | | | | | | | | | | | | | | | | | | PRE TEST | DEGREE | POST TES | DG.ANEMIA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.1 | b | a | d | a | a | b | b | b | b | c | c | b | b | a | c | e | a | 8.7 | Moderate | 9.2 | Moderate |
| 2.2 | a | c | a | a | b | c | a | c | a | a | b | a | a | b | a | a | a | 8.9 | Moderate | 9.5 | Mild |
| 2.3 | b | a | c | c | a | a | a | a | b | c | a | a | a | c | a | b | a | 7.8 | severe | 8.2 | Moderate |
| 2.4 | d | d | a | d | d | d | b | b | b | b | b | b | b | a | c | e | d | 6.2 | life threate | 6.7 | severe |
| 2.5 | a | a | c | c | a | c | a | b | b | c | b | a | a | c | b | c | b | 7.6 | severe | 8 | Moderate |
| 6 | a | b | e | a | b | a | b | d | a | b | c | a | a | b | a | a | a | 8.6 | Moderate | 9 | Moderate |
| 7 | b | a | a | b | a | c | a | b | a | b | b | a | b | b | a | e | d | 8.5 | Moderate | 9 | Moderate |
| 8 | a | c | a | a | b | a | a | a | b | c | b | a | a | c | b | a | b | 7.3 | severe | 8 | Moderate |
| 9 | a | d | b | c | a | b | b | b | a | a | b | a | a | a | a | b | a | 9.2 | Moderate | 9.7 | Mild |
| 10 | b | a | a | d | d | d | a | c | b | b | a | a | a | b | b | c | c | 9.4 | Moderate | 10 | Mild |
| 11 | c | c | b | c | a | a | b | c | a | b | b | b | b | c | b | d | a | 9 | Moderate | 9.5 | Mild |
| 12 | a | b | e | a | b | a | b | b | b | c | b | a | a | b | b | a | b | 9.1 | Moderate | 9.6 | Mild |
| 13 | c | d | b | c | a | c | a | a | a | a | c | a | a | c | a | b | a | 6.8 | severe | 7.4 | severe |
| 14 | a | a | a | d | a | a | b | c | b | c | a | a | a | b | a | c | a | 9.8 | Mild | 10.4 | Mild |
| 15 | b | b | e | a | a | a | b | b | a | b | b | a | a | b | b | d | a | 8.1 | Moderate | 8.6 | Moderate |
| 16 | a | a | d | b | b | d | b | b | b | b | c | a | a | b | b | a | a | 9.90 | Mild | 10.3 | Mild |
| 17 | d | c | a | a | c | c | b | b | a | b | b | b | b | a | c | e | c | 9.7 | Mild | 10.2 | Mild |
| 18 | c | d | e | d | c | a | b | a | a | b | a | a | a | c | a | c | c | 7.40 | severe | 8 | Moderate |
| 19 | b | a | d | b | d | d | b | a | b | c | b | b | b | a | a | e | a | 9.3 | Moderate | 9.8 | Mild |
| 20 | a | a | c | c | b | c | a | d | b | b | b | a | a | b | b | a | a | 7.8 | severe | 8.2 | Moderate |
| 21 | d | b | a | a | a | b | b | a | a | a | b | b | b | a | b | d | a | 8.5 | Moderate | 9 | Moderate |
| 22 | c | a | c | c | c | d | a | d | b | c | b | b | b | b | a | d | b | 7.5 | severe | 8.1 | Moderate |
| 23 | a | b | b | d | a | c | a | d | a | b | b | a | a | b | c | e | a | 8.4 | Moderate | 9.1 | Moderate |
| 24 | d | a | e | a | a | d | b | a | b | c | b | b | b | c | b | c | a | 6.1 | life threate | 6.8 | severe |
| 25 | a | b | b | d | b | a | a | c | a | a | a | a | b | b | c | a | a | 9.6 | Mild | 10 | Mild |
| 26 | c | a | c | c | c | b | a | d | b | c | a | a | a | b | a | c | b | 8.9 | Moderate | 9.5 | Mild |
| 27 | a | c | e | a | a | c | b | a | a | b | a | b | a | b | a | d | a | 7.7 | severe | 8.3 | Moderate |
| 28 | b | a | d | b | a | d | a | c | b | c | c | a | b | b | a | e | b | 8.9 | Moderate | 9.4 | Moderate |
| 29 | d | b | c | d | c | b | b | d | a | a | a | b | b | a | c | e | a | 8 | Moderate | 8.6 | Moderate |
| 30 | c | a | b | d | a | a | a | a | b | c | a | b | a | a | b | d | d | 9.5 | Mild | 10 | Mild |

# CERTIFICATE OFENGLISH EDITING

## TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation work, " A Study to assess and compare the effectiveness of fenugreek leaves with elemental iron and elemental iron alone on anemia among women residing in selected community at choolai, Chennai.''done by Ms.VISITRA.J, II year M.Sc (Nursing) student of College Of Nursing, Madras Medical College, Chennai-3 is edited for English language appropriateness by Ms. POORNIMA, M.A., B.Ed., M.Phil ----------.

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